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COMPUTERWORLD

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Apple delivers Unix version as Uniforum once again hosts debate about the operating system's commercial status. Pages 132,133.

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Get your personal VMS here. DEC seen readying yet another desktop strategy. Page 39.

Uh, well . . . OS/2 ports still empty

BY DOUGLAS BARNEY
CW STAFF

If you are one of the 20,000 or so buyers of IBM's OS/2, you are probably still staring at an operating system prompt instead of an application. Or maybe you are running several copies of a single application, but not one you really care about.

One thing is for sure: You are not running any of the applications that a group of overly ambitious vendors promised they would deliver by now.

Vendors contacted by *Computerworld* last week groped for excuses as to why promised applications have yet to ship for the operating system that is now 2½

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IBM drops guard, anoints Unix

Wider RT PC role, AIX standard get wary reception at Uniforum

BY ROSEMARY HAMILTON
CW STAFF

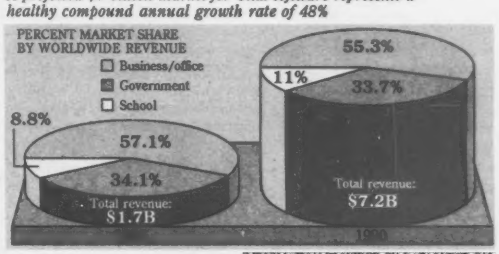
DALLAS — IBM last week abruptly reversed its long-standing resistance to the Unix operating system, anointing Unix as a key strategic element of its product line.

In an elaborate show of support at the Uniforum 1988 conference here, IBM unveiled enhancements for its line of AIX-based workstations and announced plans to participate actively in Unix standard-setting activities. Separately, IBM designated its oft-criticized RT Personal Computer as a strategic, general-purpose mid-range system.

However, the moves quickly drew skepticism from Unix industry watchers, who said IBM had little choice but to embrace the thriving operating system standard.

Too large to ignore

A projected $7 billion market for Unix software represents a healthy compound annual growth rate of 48%



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART

Nothing but homemade

"It's been the old not-invented-here syndrome," said David Fiedler, editor of "Unique," a Unix newsletter published by Infopro Systems in Rescue, Calif. "Unix is an AT&T product. That sort of thing is important to IBM."

One analyst said IBM was left with no choice but to ramp up its Unix efforts in response to the U.S. government's commitment to Unix as well as that of other major customers, such as General Motors Corp.

"The Unix market is becoming critical for them," said Judith Hurwitz, an editor of "Unix in the Office," a publication of Patricia Seybold's Office Computing Group. "About 70% of the federal government's requests for proposals now require Unix."

IBM put forth the following intentions for Unix:

Continued on page 132

PS/2s make killing in Wall Street stock firms

BY JAMES DALY
CW STAFF

Although still maligned by many observers, IBM's Personal System/2 is poised to dramatically impact end-user computing on Wall Street, where two brokerage firms plan to install tens of thousands of the machines to replace real-time stock quote systems.

Automatic Data Processing, Inc. will serve as middleman for one of the largest PS/2 sales to date when it begins delivering the first of more than 40,000 systems to Shearson Lehman Hutton, Inc. and Merrill Lynch & Co in the next few months. The systems will be bundled with ADP's Financial System Partner stock quote service.

The deal marks a major victory for IBM in getting its Micro Channel bus architecture onto Wall Street at a time when vendors like Sun Microsystems, Inc. and Apollo Computer, Inc. are ardently courting the financial community with their high-powered workstations.

"Sun and Apollo may offer similar services, but we don't need their power, their speed or their expense," said Bill O'Neil, vice-president of strategic technology planning at Shearson Lehman. "The Sun and Apollo machines are tremendously fast,

Continued on page 6

AI superstar plunges to earth

Knowledge-based expert systems delivered on symbolic processing machines are "a trend that I'd say is unstoppable at this point."

Russell Noftsker
Chairman, Symbolics, Inc.
February 1986

"I don't want to see the company fail. I don't want to see any more employees lose their jobs."

Noftsker
February 1988

BY CLINTON WILDER
and STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Like Icarus, Symbolics, Inc. thought there was no limit to how high it could soar.

Its technology was the envy of that sexy new industry, artificial intelligence, and its rapid climb to the $100 million revenue level in 1986 earned it acclaim as "a stock market superstar."

Symbolics' Noftsker

Now mired in red ink and leaderless — its founders having been eased out of control — the firm stands as a classic case of missed opportunities, overreaching ambition and market insensitivity.

"Success can be seductive," said Barbara Isgur, a technology analyst with D. H. Brown Associates in Tarrytown, N.Y.

"It's hard to know when to turn the corner or change direction. I can't think of a company that's been able to do that without a lot of pain," Isgur said.

Symbolics — which sprang up at the forefront of an indus-

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NEWSPAPER
SECOND CLASS

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Dexpo. With an eye on the Apple-DEC alliance, TOPS prepares a software package that enables a VAX to act as a network file server for the Mac, Novell announces a VMS version of Netware and Odesta readies Helix VMX DBMS with access to RMS files. Page 7.
Uniforum. Commitments to Unix run rampant as Apple starts shipping its own Unix version and AT&T details plans for Unix System V, Release 4 with real-time capabilities. Pages 132, 133.

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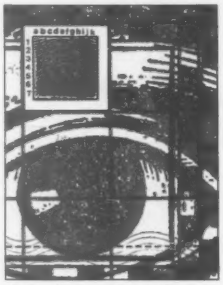

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Quotable

"Two or three years ago, this was a small show of ponytails and blue jeans. This year's Uniforum is a very corporate show."

JUDITH HURWITZ
PATRICIA SEYBOLD'S OFFICE COMPUTING GROUP

See story page 132.

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Return to sender

Distributor, FBI baffled over missing IBM 9375

BY KATHY CHIN LEONG
CW STAFF

Lost: *One IBM 9375 Model 60 mid-range computer, related storage devices and printer. Weighs about 1,000 pounds. Sentimental value. Owner concerned.*

SANTA CLARA, Calif. — It seemed like a normal business day for distributor Marketex Computer Corp., when a Jim Peters of Tampa, Fla., ordered a used IBM 9375 over the telephone. But events quickly took a strange turn.

Marketex arranged for a shipping company to deliver the system to a residential address given to it by the caller, who said he worked for a company called Systems and Simulation, Inc., an actual engineering firm in Tampa. The computer has not been seen since.

Now, three weeks later, the Federal Bureau of Investigation and county police are on the lookout for the IBM 9375 Model 60, serial number 00248, four IBM 9335 disk drives, a tape drive and a printer. The market value is estimated at $191,000.

Marketex found that Systems and Simulation never had an employee named Jim Peters and that the apartment to which the computer was delivered was under the alias of a Michael Ray Shaeffer.

"The guy on the phone played us like a piano," Marketex President Russell Schneider said. "He negotiated. He asked for that model specifically. He knew the equipment and was extremely conversant in technology."

Marketex had run a credit check on Systems and Simulation but never on Peters. Schneider said it is standard business practice to perform a check on the potential buyer.

To add to the confusion, the FBI told Schneider that the apartment tenant used a fraudulent name and showed false identification papers. Investigators did tell Marketex that witnesses saw the tenant transferring equipment into a moving van.

If only we sent a 4381

"This would have never happened if we had shipped a 4381," Schneider lamented. He pointed out that while other IBM hosts must be installed by an expert, the IBM 9375 can be installed and serviced by users.

When third-party vendors install and maintain IBM products, they follow a strict accounting procedure of reporting the serial number after each check is stored in an IBM-operated data base. Now, Schneider says he has no idea where the IBM 9375 will show up next.

"People suggested that the person could have shipped it over to Cuba," Schneider said. "After all, it's only a four-hour boat ride."

Bob Golko, chairman of the Computer Dealers and Lessors Association, called the case bizarre.

"It is unusual for a distributor to ship a system off to a customer who it does not already know. . . . If there is ever a service call made on it, we will be able to track it down," Golko said.

NECIS withdraws U.S. plans

BY ALAN J. RYAN
CW STAFF

BOXBORO, Mass. — NEC Information Systems, Inc. (NECIS) has withdrawn plans to distribute low-end and mid-range workstations to the growing North American market this spring.

Frank Girard, NECIS vice-president of systems marketing, said the firm is currently reevaluating the positioning and pricing of the workstations but is not permanently abandoning the market.

"We're looking at some of the price points and also maybe looking at addressing a higher end marketplace," Girard said.

In the interim, NECIS will continue porting applications software to work with the workstations, Girard said.

Girard denied speculation that NEC Tokyo, which produces the workstations, was displeased with the marketing strategy NECIS planned for the systems. "Our strategy was fairly clear . . . basically going after the OEM and value-added reseller marketplace and, of course, using the advantages that our dealer distribution channel provided," he said.

According to one workstation market analyst, the vendor that can successfully sell workstations through dealer channels remains to be named. "We know that neither Sun nor Apollo have made outstanding headway thus far in setting up dealer networks," the analyst said.

Girard said that while OEMs had expressed interest in the workstations, no contracts had been signed.

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Ashton-Tate feeds Mac demand

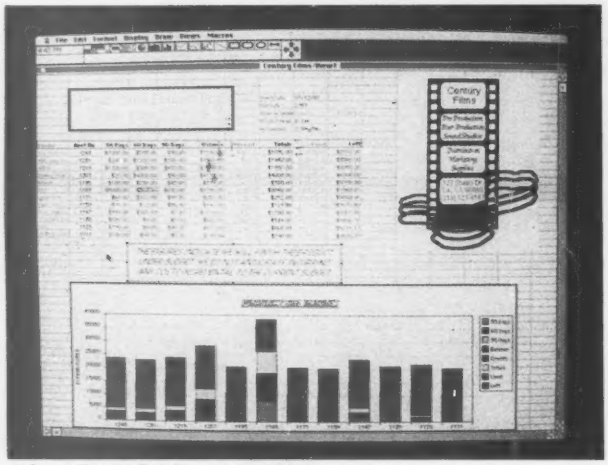
Broadens presence in market by adding spreadsheet, word processor

BY STEPHEN JONES
CW STAFF

PALO ALTO, Calif. — Ashton-Tate Corp. last week filled out its line of applications for Apple Computer, Inc.'s Macintosh with a multifunction spreadsheet aimed at presentation-hungry users and a word processor that features advanced desktop publishing capabilities.

Ashton-Tate's push into the Mac market, along with recent similar efforts by such companies as Lotus Development Corp. and Symantec Corp., promises to extend the list of applications choices for corporate Macintosh users. Most of today's best-selling programs, such as Word and Excel, belong to Microsoft Corp.

"This strengthens Ashton-Tate's presence substantially in the Mac world, and they have the resources needed to get some [dealer] shelf space for these products," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.



Ashton-Tate's *Full Impact spreadsheet*

Outside help

The Full Impact spreadsheet and the Fullwrite Professional word processor from Ashton-Tate are based on technology from outside firms.

The company will position Full Impact, which costs $395, as a presentation-oriented package that enables users to combine text, data and graphics on a single page for business-related presentations. Apple has identified such desktop presentation capabilities as a key to future Macintosh programs.

Full Impact uses the standard Mac interface, offers full color support and multiple fonts and can open eight spreadsheets at once. Import and export functions support applications from DOS and Mac environments, including Ashton-Tate's Dbase III Plus, Lotus's 1-2-3, Microsoft's Sylk and IBM's Data Interchange Format file formats.

The package, based on technology from Encore Software and scheduled to ship by July 31, also features a variety of macro capabilities and customized icon bars that allow users to create a library of functions.

It runs on the Macintosh SE or Macintosh II and requires one 800K-byte disk drive and a hard disk drive or two 800K-byte disk drives with 1M byte of random-access memory. The program disk requires 800K bytes of memory.

While analysts praised the graphics features of Full Impact, Ed Esber, Ashton-Tate's chairman and chief executive officer, downplayed the package's chances of knocking Excel off as the No. 1 Macintosh spreadsheet.

"We're not saying that this product will immediately take over the leader in the spreadsheet market, but it will be a strong second," Esber said.

Ashton-Tate will take a more competitive stance against Microsoft Word by publishing Fullwrite Professional, which Ashton-Tate acquired with its recent purchase of Ann Arbor Softworks, Inc. in Newbury Park, Calif. Ashton-Tate will also sell Ann Arbor's Fullpaint, a $99.95 graphics generator for the Mac.

That's a wrap

Fullwrite Professional, which sells for $395 and is set to ship by April 30, features a what-you-see-is-what-you-get display of text and graphics. Analysts said they were impressed with its built-in drawing environment for page layout, which enables text to automatically wrap around a graphic design.

The word processing side of the program includes a procedure that automatically updates the outline of a document while it is being created, a 100,000-word spelling checker and a 220,000-word thesaurus. It works with all Apple-supported and Adobe Systems, Inc. Postscript-compatible printers, and it requires two floppy disk drives or one hard disk drive.

Ashton-Tate also announced Dbase Mac Runtime, a $795 execute-only package that lets developers distribute custom applications developed with the firm's Dbase Mac data base.

Esber said the company will consolidate its Macintosh operations near Sunnyvale, Calif. — and Cupertino-based Apple — by the end of August. The division will be home to about 50 development and sales and marketing employees who are currently working at three locations in Southern California.

Dbase group passes IEEE the baton

BY DOUGLAS BARNEY
CW STAFF

A committee that attempted to standardize the Dbase language without the consent of Dbase developer Ashton-Tate Corp. has disbanded and turned its work over to a study group formed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE).

The Dbase Standards Working Committee was formed last year by a group of Dbase clone and tool vendors. The goal was to develop a standard language so that applications would be portable across the range of Dbase-like products.

Ashton-Tate objected to the efforts, largely on the grounds that the group infringed on the Dbase trademark. The firm sent letters to committee members, demanding that the committee cease and desist from trademark infringement.

Legalese?

In previous conflicts, Ashton-Tate's counsel has also implied that the language itself was proprietary and, thus, protected by law.

The study group formed by the IEEE is only the first step in the long road toward possible standardization of the Dbase language. But as long as the group does not use the name "Dbase," Ashton-Tate will not interfere with its efforts, said Roy Folk, executive vice-president of Ashton-Tate.

Ashton-Tate, however, said it has not given up on protecting Dbase, even if it means suing vendors that clone it.

Cloners get some slack

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. scaled back its tough-guy approach toward Dbase clone makers last week, announcing a marketing deal with a potential foe and offering an olive branch to other developers.

The company said it acquired publishing rights to Frontrunner, a language development tool for Dbase III Plus developed by Pittsburgh-based Apex Software Corp. Frontrunner recently was added to a list of several Dbase clone programs that irked the copy-sensitive Ashton-Tate during the last year.

But instead of dragging Apex into court to contest possible Dbase copyright infringement, Ashton-Tate said it will sell the program as a "popular" $195 add-on to Dbase III Plus.

That may shock some clone makers, who late last year were challenged by Ed Esber, Ashton-Tate's chairman and chief executive officer, to "make my day" by copying Dbase proprietary technology.

By last week, however, Esber had toned down his words.

"We want to work with third-party add-on people and make them a better part of the family than we have in the past. I'm not doing my Clint Eastwood [imitation] anymore," Esber said.

Observers said Ashton-Tate will expand the market for Dbase III Plus by working with add-on makers while turning the firm's focus to future releases of Dbase for DOS and IBM OS/2 environments.

Esber, however, maintained that Ashton-Tate will continue to keep the Dbase III Plus technology under tight wraps.

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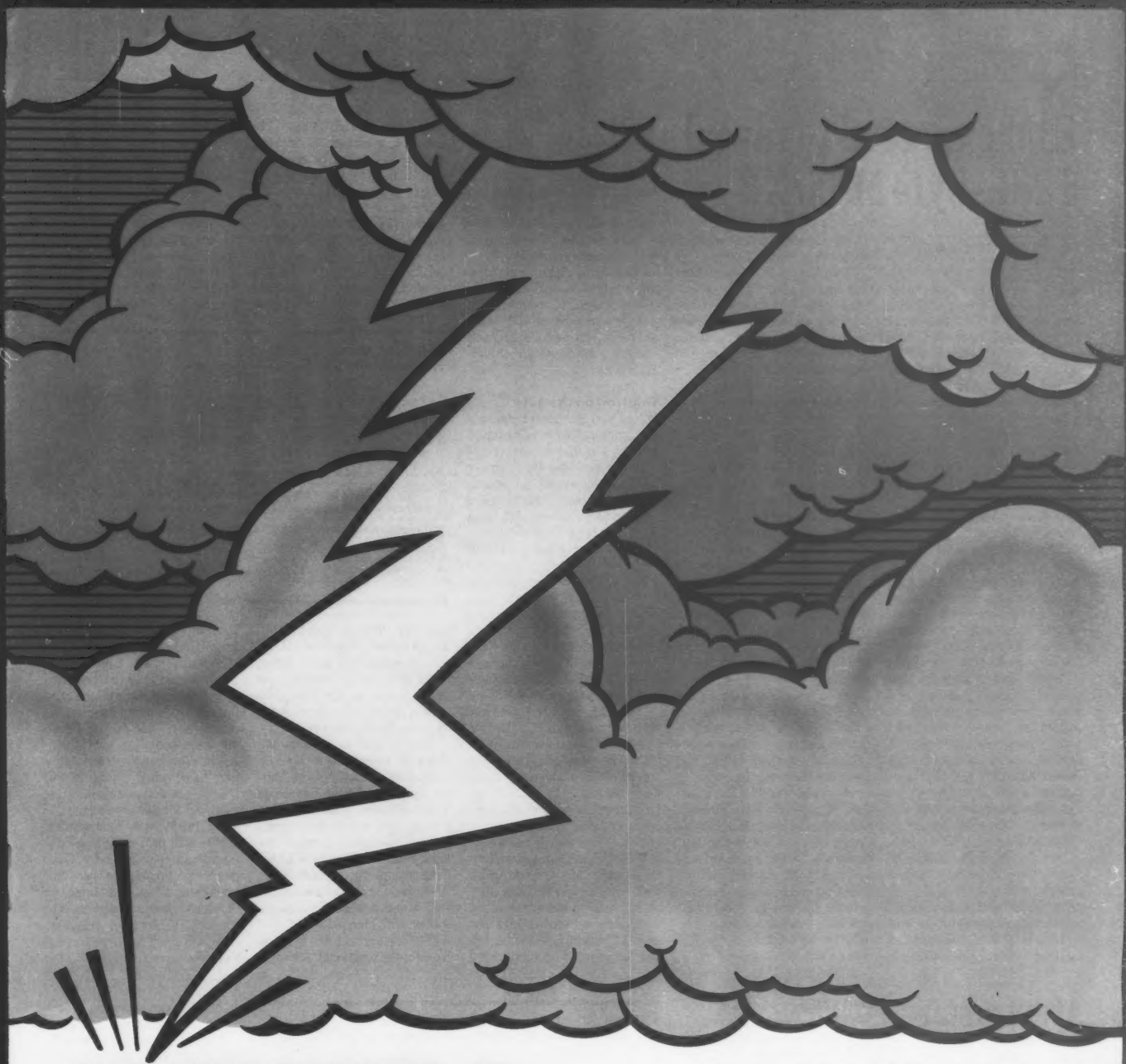

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IBM expected to reveal 128G-byte MVS/XB

BY JAMES CONNOLLY
CW STAFF

IBM is ready to announce the follow-on to its premier operating system, MVS/XA, this week with extended addressing that could support main memories of up to 128G bytes in the near term and 15T bytes in the long term, according to a variety of industry observers.

The extended addressing would allow memory increases by orders of magnitude above the current 31-bit addressing's 2G-byte architectural limit and pave the way for new IBM mainframe architectures. The company scheduled a press conference for Monday morning; analysts alerted to the briefing voiced various predictions on the new addressing limit. Those ranged from a 37-bit scheme that would allow 128G bytes of memory to a 47-bit architecture.

While most analysts dismissed reports that the announcement will include a third-generation 3090 mainframe family commonly called the "F models," one consultant said those models, the new MVS version and a new I/O architecture that will support high-speed, 6M byte/sec. fiber-optic channels are likely to debut.

Bob Djurdjevic, president of Annex Research in Phoenix, said sources within IBM indicated the F models will be announced and that their performance will be 20% to 25% higher than the existing 3090E models because of hardware enhancements and the new operating system.

Djurdjevic said IBM may have finalized the decision to announce the F models within the past two weeks. He said IBM's goal is to spur demand for 3090s in expectation that demand otherwise may fall off this year.

F models in springtime?

Consultant Bill Husband of the Meridian Group, a leasing company in Deerfield, Ill., said what he called MVS/XB will be announced this week, followed by the F models in April.

He also said IBM may provide insight into where it is going with the F models and subsequent mainframes known by the code name "Summit."

"I think what we might get is an IBM statement of direction on things like Summit. They might take the opportunity to confirm a lot of what they have been telling customers privately for a while," Husband said. He said one future benefit of extended addressing could be to support a massive shared memory that can be accessed by multiple 3090 and Summit-class machines.

However, Per Flaaten, manager of information technology research at Arthur Andersen & Co. in Chicago, noted that one drawback to the extended addressing is the possibility that it will be accomplished in a retrofit manner by stringing together multiple address spaces for a program rather than through a true architectural change.

PS/2s

FROM PAGE 1

but the PS/2s are no slouch, either. We figured out what resources we needed and came up with a logical decision to take the less expensive alternative."

Both firms plan to begin phasing out their network of Quotron Systems, Inc. terminals in the next few months as ADP starts delivering its service prepackaged on a configuration of high-end PS/2s.

Quotron on the outs

O'Neil said Shearson Lehman is planning a rollout in a flagship office for the fourth quarter and will take the next few years to replace its stable of nearly 20,000 Quotron workstations with an arrangement that leans heavily on the PS/2 Model 50.

"Quotron is a dumb terminal with old technology," O'Neil added. "This system gives us live market quotes, which satisfies the Quotron function, plus a PC-DOS partition in which you can write industry-specific applications, and it offers spreadsheet, data base, word processor and graphics capabilities."

Merrill Lynch executives said their company's 23,000 Quotron systems will also eventually go. "The deliveries are going to be spread out over the next two or three years," said Rich Gaiti, vice-president of the advanced office systems group at Merrill Lynch. "We'll mostly be looking at [PS/2] Model 50s, but we'll include some Model 60s, which we'll be using as a network server, and some Model 80s."

Sources at Merrill Lynch also said ADP will include an unspecified number of diskless PS/2 Model 50s, which IBM has yet to announce but which the firm has reportedly been using on a custom-bid basis for the past several months [CW, Feb. 1].

Financial System Partner is an ambitious consultant system that uses windows to allow a broker to look at a wide variety of services, including the client's portfolio, stock prices and spreadsheets with live quotes.

Market maker

Features of ADP's Financial System Partner

- Market data services
- Live market quotes
- IBM PC-DOS partition with a spreadsheet, data base, word processor and graphics
- Ability to run local PC applications
- Optional office automation server with additional word processing, spreadsheet, file server and print spooler
- Direct broadcast over telephone lines or satellite dish
- Link to ADP client data base
- Cost per workstation of $150 to $300 per month

CW CHART

The system runs under IBM's PC-DOS, but "migration to OS/2 will be mandatory in the future as far as we're concerned," said Larry Jones, senior vice-president of product management and systems development at ADP.

The system is a direct offshoot of International Marketnet (Imnet), a joint venture Merrill Lynch and IBM formed in 1983 to develop a financial information system both for internal use and to market to other brokerage houses. When the Imnet deal crumbled early last year, ADP stepped in and announced that it would work on a similar system with Merrill Lynch.

The deal could be a major blow for the functional, but some say outdated, Quotron system. Shearson Lehman and Merrill Lynch are two of Quotron's oldest and largest customers; both have used the system since the mid-1970s.

Additionally, when Los Angeles-based Quotron was acquired by Citicorp in 1986, Merrill Lynch was forced into the distasteful situation of fattening a competitor's wallet with each monthly service payment. "I know that Quotron also bid on this contract, but I don't think the fact that Quotron is owned by a company many consider to be our archenemy helped the matter any," one Merrill Lynch employee said.

Quotron, however, is not taking the switch lying down. "We've got a contract with Merrill Lynch for this service into the early 1990s, and I know we'll continue to prosecute that contract," said George Levine, Quotron's vice-president of sales and marketing. "We'll continue to develop applications and provide services to Merrill Lynch that ADP will need to meet to provide a comparable service."

AI superstar

FROM PAGE 1

try subculture nurtured by MIT-trained developers in a revitalized section of Cambridge known as AI Alley — built its success on dedicated LISP workstations for AI software development. Known as the Porsches of AI workstations, Symbolics systems in the $100,000 price range were the platform of choice in AI development labs.

"They went to places that could afford to give their high-priced scientists a seat and an expensive machine," said Terry Shannon, editor of a newsletter for the Digital Equipment Computer Users Society, the AI special interest group of Digital Equipment Corp. users. "That's a bounded market that has been pretty well saturated."

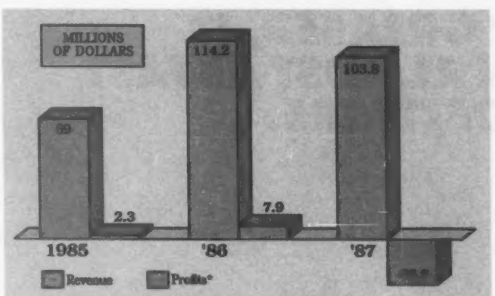
While Symbolics' rate of new installations stalled, an increasing amount of AI and expert systems development was emerging on industry-standard hardware platforms running Unix, DEC VMS and Microsoft Corp. MS-DOS operating systems. That trend has continued, leaving Symbolics behind.

According to company cofounder Noftsker, who resigned as chief executive officer earlier this month but remains as chairman, Symbolics made a key strategic blunder in 1983. At Noftsker's urging, the company considered development of the so-called Ivory chip, a microprocessor containing all of the Common LISP language. In theory, such a chip could be incorporated into industry-standard hardware platforms as an AI development coprocessor.

But, Noftsker said, Symbolics' board rejected the project at the urging of the research and development vice-president. Noftsker was able to restart the effort in 1985, but the delayed three-year development cycle cost the firm a critical window of opportunity. Symbolics announced the chip last spring [CW, May 18, 1987] but said it would not ship until later this year.

Plunge to earth

Symbolics' financial performance has fallen far and fast since the glory days of 1986



INFORMATION PROVIDED BY SYMBOLICS, INC.
CW CHART

Noftsker was removed from day-to-day operations 10 days ago in a management shake-up that also included the departure of Brian E. Sear, president and chief operating officer. Sear was brought in to spark a turnaround when Symbolics began skidding. He orchestrated several cost cuts, including the reduction of the work force from almost 1,000 to 650 and the abortion of the company's move to more spacious quarters.

"There was a difference of opinion as to what could be cut and what could not," Thomas Farb, Symbolics' treasurer and acting chief financial officer, said of Sear's resignation.

"Sear was perceived as cutting the future," said Esther Dyson, editor of the "Release 1.0" newsletter.

What the future holds for Symbolics is now a major question mark. Most observers said they feel Symbolics must find its niche with AI development software for others' hardware platforms, and there is potential for OEM sales of the Ivory chip.

But at this point in the firm's volatile history, observers are at a loss as to how to chart a Symbolics recovery strategy. With Symbolics stock trading at less than $2 per share, an acquisition or purchase of assets may be the company's fate, as it was for Lisp Machine, Inc. last year.

Ironically, the LISP machine market leader's chance for survival may depend on its ability to catch up in the non-LISP hardware world.

"Having a superior product that's not where the parade is going," Dyson said, "leaves you out of the parade."

All aboard Apple-DEC bandwagon at Dexpo

TOPS, Novell lead slew of vendors eager to hitch a ride with new duo

BY ALAN J. RYAN
and NELL MARGOLIS
CW STAFF

NEW YORK — And now, your local weather report for Dexpo East '88: This week, the Big Apple will be hit by a blizzard of buzzwords as companies eager to attach themselves to the recent strategic alliance of Digital Equipment Corp. and Apple Computer, Inc. blanket the area with "connectivity," "interface" and "seamless access" announcements.

In an effort to network Apple Macintoshes, IBM Personal Computers and DEC VAXs, Berkeley, Calif.-based TOPS said it will unwrap TOPS/VMS this week.

Slated for third-quarter availability, the networking software package reportedly will let a VAX act as a TOPS Network file server, giving Macintosh and PC users access to large-capacity disk storage, high-volume backup functions and improved data security.

Users will also be able to draw files from the VAX, share them and then return them to the VAX for storage and backup in VAX format, the company said. Additionally, the VAX can act as a network file server, letting users launch Macintosh applications or PC programs on microcomputers from the VAX.

Provo, Utah-based Novell, Inc., the personal computer local-area network giant, is expected to make its VAX environment debut with a VMS version of its Netware operating system.

With more than 160,000 operating system installations worldwide, Netware is regarded as a LAN standard. However, some have already questioned whether Netware/VMS will give users something new or merely widen their choices.

"Excelan has a product out that already achieves integration between the DOS world and the VMS world," said Paul Sherer, an analyst with Robertson, Colman & Stephens in San Francisco. He called the Excelan, Inc. connection "a robust product that does the job well."

The Netware/VMS announcement will be "Novell positioning itself as a multivendor player," Sherer added.

Whether Netware/VMS turns out to be something new or not, companies are already lining up to support it. Sources close to Relational Technology, Inc. reported that the Alameda, Calif., relational data base management system maker will announce Ingres support for the Novell DOS/VAX LAN at Dexpo.

Oracle Corp. will also reportedly announce an agreement with Novell to develop a file server product for Netware/VMS and an agreement with Interlink Systems, Inc. to get SQL Net to run on Interlink's Datacomm Gateway.

Another product expected to debut at Dexpo is Odesta Corp.'s Helix VMX DBMS with access to RMS files, which reportedly will ship later this year. Helix VMX already uses the Macintosh as a front end, with a VAX as a back end. One drawback to the system, however, is its inability to easily work with VAX/VMS RMS files.

"The piece of the puzzle that has been left out was that most data on VAXs is sitting in RMS files," said Daniel Cheifitz, president of Odesta.

IBM jacks up service prices

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — Following a year of maintenance price cuts, IBM last week boosted charges for some hardware maintenance, equipment rental and use of its Information Network, a remote computing service.

IBM announced that monthly rental and leasing fees for IBM computers will jump 7%, effective June 1.

IBM's National Service Division raised its hourly service rates 15%, effective last Friday. In addition, IBM Maintenance Agreement charges are being increased 7% for some mainframe products, 10% for some IBM copiers and 15% for many machines not covered by IBM's Corporate Service Amendment (CSA), effective June 1.

Throughout 1987, IBM progressively cut its maintenance prices and enticed customers to apply for its CSA by implementing steep discounts and free after-hours maintenance. In November, all IBM Maintenance Agreement customers were handed 24-hour, seven-day-a-week service at no extra charge.

"IBM had cut its maintenance prices to the bone. Perhaps they cut them too much," said Richard Forsythe, president of Forsythe McArthur Associates, Inc., a Skokie, Ill.-based computer leasing firm.

IBM said it will raise fees for the use of the Information Network by 7%, effective April 1. IBM also said connectivity service, storage, network traffic and 800-number dial-access charges will remain the same.

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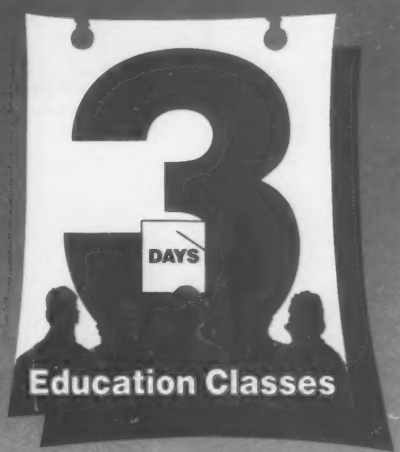

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Cray blazes path for X-MP users

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — Cray Research, Inc. redirected the mainstream of its supercomputer line last week when it announced the Y-MP/832 as an extension to the 6-year-old X-MP family.

The $20-million Y-MP is more than twice as powerful as the X-MP/416 and is rated faster than the Cray-2.

In addition to offering a growth path for the 114 X-MP users — the majority of Cray's 173 users — the Y-MP announcement was a major step in Cray's shift from its COS operating system to Unix.

Cray's brand of Unix, called Unicos, is standard on the Y-MP, as it has been for the Cray-2. Noting that COS supports only four processors and 16M words of memory, Cray said COS is available as an option.

Down to X-MP level

While declining to discuss future Y-MP models, Cray promised to migrate Y-MP technology down from the eight-processor Y-MP/832 into the X-MP line.

The Y-MP features 32-bit addressing and circuits that are 1,000 times denser than those used in the X-MP. As a result, Cray claimed that its first eight-CPU system is smaller and easier to maintain than the X-MP and uses 30% faster processors.

With a theoretical performance level of 3 billion floating-point operations per second (GFLOPS), the Y-MP ranks well below the claims by crosstown rival ETA Systems, Inc., which rates its ETA-10 at 10 GFLOPS.

Actual supercomputer performance tends to be a fraction of such ratings. The ETA-10 performs 52 million floating-point operations per second (MFLOPS); a single-processor X-MP, 39 MFLOPS in the Linpack benchmark.

The Y-MP/832 features twice the memory — 32M words — of any of the 11 X-MP models. The X-MP, introduced in 1982, complements the Cray-2, Cray-3 and Cray-4 systems being developed by Cray.

A Cray spokesman said a successor to the Y-MP remains in development, despite last year's resignation of designer Steven Chen. The Y-MP follow-on is targeted for the early 1990s.

Cray Chairman John A. Rollwagen said the successor to the Y-MP, known as the "Y," is the subject of a development project launched a year ago alongside Chen's massively parallel processor "MP" project. He said the Y will be an evolutionary extension of the Y-MP with faster processors, more CPUs and additional memory.

Two major Cray customers, each with at least eight Cray supercomputers, were happy to see the Y-MP's compatibility with the X-MP and the increased number of CPUs.

"We have already signed a contract to buy two. The major thing to me is that we can almost consider it an X-MP/832 rather than a Y-MP," said Norman Morse, division leader for the computing and communications division at Los Alamos National Laboratory in Los Alamos, N.M. That laboratory was the first Cray customer in 1976.

'Standard setter'

John E. Ranelletti, head of the computation department at Lawrence Livermore National Laboratory in Livermore, Calif., noted, "Cray machines continually set the standard for supercomputing." He said eight processors make time-sharing easier. However, he said, users and vendors still must meet the challenge of designing software that will automatically run in parallel on such multiprocessors.

Hal Feeney, director of technical computing services at market research firm Dataquest, Inc. in San Jose, Calif., observed that the Y-MP is evolutionary, not revolutionary.

"It's very impressive," Feeney said. "It looks like Cray is doing what Cray does best, which is press the technology and press the performance." He said the shift to Unix is a natural move in technical computing, in which the operating system standards are Unix, IBM's MVS and Digital Equipment Corp.'s VMS.

The Y-MP/832 was designed to run X-MP applications in a 24-bit mode or new applications in a 32-bit mode. The Y-MP processors are built with 2.5K-macrocell gate arrays.

The denser circuits allow Cray to package each CPU in a two-board module, compared with 144 modules per CPU with the X-MP. The shorter circuit paths mean a reduction in the cycle time from the X-MP's 8.5 nsec to 6 nsec.

The Cray-2, with eight times the memory of a Y-MP, tends to be used more for research in fluid dynamics and image processing, while the X-MP and Y-MP are more suited in time-shared engineering environments.

Rollwagen said Cray expects to ship three or four Y-MPs this year, starting in the third quarter, and about 12 in 1989.

Heavy hitters

Introduction of Cray's Y-MP system broadens the supercomputer company's lineup of multimillion-dollar machines

	Number of processors	Memory size (in millions of words)	Performance (GFLOPS*)	Price (in millions)
Cray Y-MP/832	8	32	3	$20
Cray-2S/4-128	4	128	2.1	$17.5
Cray X-MP/416	4	16	1.2	$16

* Billions of floating-point operations per second, based on *Computerworld* estimates

CW CHART

OS/2

FROM PAGE 1

months old. One developer said there are not enough users for a decent beta test. Another blamed a combination of an unavailable C compiler and post office delays. Ironically, none cited the process of actually porting the applications to OS/2, which they all said is easy.

Say it in bold

Oracle Corp. made perhaps the boldest prediction in a series of advertisements last year that promised to ship an OS/2 version of its Oracle data base management system the first day the new operating system shipped. That day was Dec. 4. Oracle for OS/2 is still not available.

According to Oracle, the key holdup is in testing, not porting, the product. "There aren't many copies of OS/2 out there. It is hard to get software tested under OS/2 in real-world conditions," said Gene Shklar, director of marketing for Oracle's PC product line.

Oracle said, however, that it will show off its OS/2 product next week and that it now plans to ship by the end of March — nearly four months later than originally planned. Prerelease versions of the product have shipped since January, Shklar pointed out.

Users looking forward to the first-quarter delivery promised for Borland International's Paradox DBMS software should put their wallets back in their pockets. Paradox will ship in the second quarter, according to Borland President Philippe Kahn.

Kahn, who was one of the first to promise a first-quarter delivery of OS/2 applications, said the delay stems from the need to avoid "fast and sloppy ports."

At an IBM seminar last week, Kahn outlined plans for future ports of Borland's Quattro spreadsheet, upcoming Sprint word processor, Sidekick Plus and language tools. This time, Kahn did not provide specific delivery dates, except to say that the products will ship this year. He did say that versions of Paradox for the OS/2 Presentation Manager and IBM's OS/2 Extended Edition will ship by the end of this year.

> USERS looking forward to the delivery promised for Paradox DBMS software should put their wallets back in their pockets.

Informix Software, Inc. originally planned to ship OS/2 versions of its relational data base software nearly as soon as OS/2 shipped, acknowledged Stephen E. Hill, the firm's director of product marketing. That project was delayed because of IBM shipping delays, he said.

"To IBM, shipping means it just gets off their docks" but not necessarily into users' hands, Hill said. As a result, Informix did not receive a copy of OS/2 until Christmas — just in time for the project to be further delayed by the holiday break. Informix wrapped up its port last month and is scheduled to ship the final version this week. Beta-test versions have shipped since last month, Hill noted.

Although no major applications are currently shipping, there is a slight sample of smaller programs currently available to pioneer OS/2 users.

These include Thinktank from Symantec Corp.'s Living Videotext division, a pop-up programming Help system from Peter Norton Computing, Inc., programming tools and diagnostics from California Software, Inc., the GSS Graphics Development Toolkit from Graphics Software Systems, Inc. and the Btrieve development tools from Novell, Inc.

Computerworld West Coast correspondent Stephen Jones contributed to this report.

Layoffs, low funds ail Celerity

BY STANLEY GIBSON
CW STAFF

SAN DIEGO — A shift to selling in the crowded minisupercomputer market has apparently backfired on start-up supermini-computer maker Celerity Computing, which recently laid off a number of workers and now seeks more funding in order to survive.

In a filing last month with the U.S. Securities and Exchange Commission (SEC), Celerity said a "substantial work force reduction" would take place Jan. 29. *The San Diego Union* reported that 50 workers were let go at that time. In the SEC filing, the company blamed the problem on delays in receiving parts from a single-source supplier.

The company also announced that it would have to receive $2 million in the very near future to continue operations. The firm said it has not received any firm commitments yet.

Technology for sale

According to a former employee, Celerity stopped selling computers in late January when the firm laid off all employees except those in research and development. Efforts are now being made to sell the firm's technology, the former employee said.

Founded in May 1983, with Hambrecht & Quist Venture Partners as the lead investor, Celerity offered its stock for public sale last summer. Total funding, including the public offering, came to $31.5 million, according to information released by Celerity.

Celerity officials did not return *Computerworld's* calls concerning the company's recent troubles. Hambrecht & Quist partner Robert Morrill, who is on Celerity's board of directors, declined to comment.

Last summer, another Hambrecht & Quist-funded start-up, Canaan Computer Corp., ceased operations without giving notice to its customers or dealers [CW, Aug. 10, 1987]. Celerity customers and dealers could not be contacted at press time.

Celerity's 6000 product, a 64-bit reduced instruction set computer-based near-supercomputer, announced in September 1987, was expected to be delivered that November.

According to sources, however, it could not be shipped because of the parts delay, which involved semiconductors. The Unix-based parallel and vector processing system was expected to have a starting price of $250,000.

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† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.
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Microsoft ports for OS/2

Multiplan, Word updates ports of current MS-DOS versions

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Seeking to fill a void in initial OS/2 applications, Microsoft Corp. is scheduled to announce this week its plans to ship upgraded versions of Multiplan and Word that will run under IBM's OS/2 Standard Edition 1.0.

But users seeking a panacea for the current absence of OS/2 programs should not look to Microsoft for immediate answers. Multiplan is not slated to ship until sometime in May, and although early portions of Word will be demonstrated this week, the word processor will not be available until the third quarter.

Both OS/2 programs will be ports of the new upgrades of the Microsoft MS-DOS versions of Multiplan and Word and will not be written especially for OS/2 Standard Edition 1.0. Each package will come with both MS-DOS and OS/2 disk versions of the new program, Microsoft officials said.

Unlike quick-and-dirty ports to OS/2 promised by other vendors, Microsoft claimed that the Multiplan 4.0 upgrade was redesigned to take advantage of the operating system's multitasking and extended memory capabilities.

Lotus Development Corp. is following a similar plan for a dual MS-DOS and OS/2 release of 1-2-3 Version 3.0 this spring.

The current $195 price tag for Multiplan will not change for the OS/2 version, a strategy that one Microsoft developer said will also be used for other upcoming ports of MS-DOS applications. No price was given for Word.

The source said Multiplan for OS/2 Standard Edition 1.0 will have increased data base functionality, more character formatting, such as boldface and italic, and more math functions and formulas embedded in the program. It also features complete file compatibility with Microsoft's Excel and Lotus's 1-2-3.

The new version of Word will capitalize on OS/2 Standard Edition 1.0's increased memory ceiling, featuring a lengthy document and retrieval facility, extensive indexing and programmable macros, according to Charles Stevens, group product manager for word processing.

A concession of sorts

Microsoft's push for OS/2 Standard Edition 1.0 ports represents a departure from the company's earlier attitude of shying away from such simple programs. But Microsoft Chairman Bill Gates and others remain adamant that OS/2 Standard Edition 1.0 and related applications will ultimately provide little more than a transition to the OS/2 Presentation Manager, expected to ship in October.

And with fewer than 30,000 copies of OS/2 Standard Edition 1.0 actually sold, some analysts said they feel Microsoft might be one of only a handful of developers that will announce imminent release dates for similar ported applications.

"When developers see a number of OEM hardware vendors shipping OS/2, then you'll see them jumping in to test the water," said Bill Higgs, director of software research at Cupertino, Calif.-based Infocorp. "For the moment, they can sit back and watch what happens."

CASE Announces the Merger of IBM and DEC

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DEC, Emulex bury hatchet

MAYNARD, Mass. — Just in time for Valentine's Day, Digital Equipment Corp. and Costa Mesa, Calif.-based Emulex Corp. ended three years of legal combat.

"This settlement puts an end to a chapter," a DEC spokesman said of the settlement Wednesday of all outstanding litigation between the two companies. Although the companies agreed not to disclose details of their agreement, the joint settlement announcement revealed that Emulex will be allowed to license the technology that DEC once accused it of stealing.

The DEC-Emulex legal skirmishing began in 1985, when DEC charged Emulex with stealing trade secrets and infringing on certain patents on DEC's SBI, CMI, Unibus and Q-bus technologies.

Emulex counterclaimed in antitrust and later brought its own suit, in which it alleged that DEC was refusing to supply it with products and services and inducing other companies to do the same.

Coast-to-coast court-by-court volleying continued through 1987. In the end, however, the companies, not the courts, decided the cases, with each side declaring victory.

"We're very pleased with the settlement," an Emulex spokesman said.

Declining to specify a dollar figure, the Emulex spokesman said that "the impact of the settlement will not be financially material to the company." The license price, he said, will have "no effect at all on our product direction or the prices at which we sell our products."

"It made sense to settle," a DEC spokesman said. "Emulex is paying for the license; the fact that they are validates our patents."

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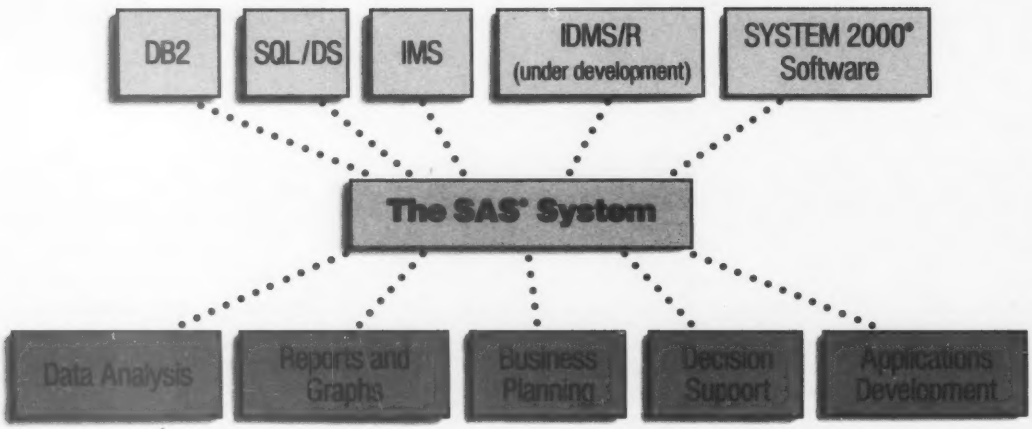

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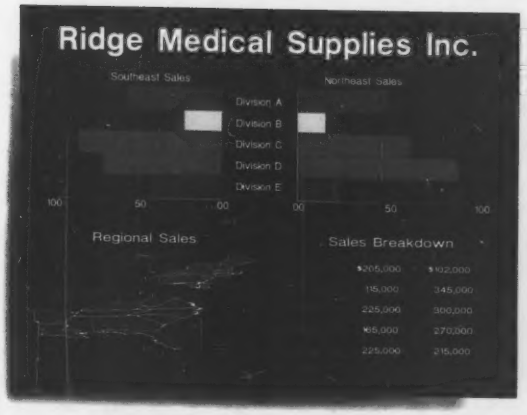

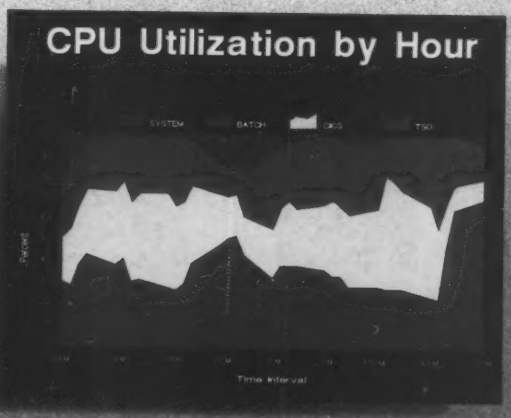

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

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Computers should not be market crash scapegoats

BY MITCH BETTS
CW STAFF

ANALYSIS

Three exhaustive investigations into the October stock market crash have been wrapped up, and what is interesting is the amount of attention each devoted to computers: Did computerized program trading cause the crash? Did the computers at the stock exchange hold up under pressure?

From the postmortem reports, it appears computers were a small part of the problem and could be a small part of the solution. Several observations can be made in the wake of "Black Monday":

• **The knee-jerk reaction was to blame the computer.** One U.S. senator, for example, quickly called for the suspension of program trading to "unwind the death spiral into which mindless, computer-driven algorithms have driven the market." Cooler heads noted that the trades were programmed by people and permitted by regulators.

Program trading refers to the use of computers to make automatic trades in stocks and futures when prices change a few percentage points. The sophisticated investors use algorithms developed by mathematicians known as "rocket scientists."

• **Program trading made the plunge worse.** No one claims program trading caused the crash, which was triggered mostly by jitters about the economy. But just when it seemed the market might bounce back on Black Monday morning, huge sales by just a few program traders nipped the rally in the bud.

The chain reaction of two types of program trading, index arbitrage and portfolio insurance, accelerated the crash, according to reports by the president's Brady Commission and the staff of the Securities and Exchange Commission (SEC).

At critical points, program trading accounted for 30% to 68% of the New York Stock Exchange (NYSE) volume, the report said.

• **Computers at the stock exchanges worked remarkably well under the intense pressure and record volume but not well enough.** Problems arose in several markets and were typified by the overloaded device controller and card printers on the NYSE floor, according to a report by the U.S. General Accounting Office.

Delays from the overloaded printers meant that orders were not executed at the same price they were entered, which had ripple effects throughout the market, the report said.

• **Computers should be used to monitor trading activity.** Information systems at the stock, futures and options markets should be upgraded to make it easier for regulators to monitor trading problems, the Brady Commission said. The systems should provide more details about each trade and the ultimate customers.

"This information can be used to diagnose developing problems as well as to uncover potentially damaging abuses," the commission said. In other words, it might help to avert another market meltdown — or at least make it easier to write postmortem reports.

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Securities firms sustain investment

Study reveals trading system purchases will increase — within limits

BY ALAN ALPER
CW STAFF

NEW YORK — Despite fiscal constraints resulting from volatility in the world's financial markets, securities firms expect to continue investing heavily in information technology this year to reduce operating costs and enhance productivity, according to a recent study.

The study, conducted last month by Audits & Surveys, Inc. and sponsored by Digital Equipment Corp., found that the 202 securities firms polled said they will increase their investments in information technology by an average of 18% this year.

That figure is far lower than the 30% to 40% annual increases in information technology expenditures that became standard practice for securities firms during the bull market of 1982 to 1987, industry analysts emphasized.

Better data management

The findings, disclosed during a panel discussion at the Securities Industry Association's Information Management Conference here last week, suggest that securities companies will continue investing in trading systems that provide more efficient management of market data and back-office automation.

"Companies will focus their spending on areas that reduce costs in data processing and hone in on projects that can reduce operating costs," said Hal Rich, a panel member and chief information officer at Citicorp's Investment Bank unit.

"We're going through a stage where we need to block and tackle better," added panel member Gerald Ely, director of capital markets information systems at Merrill Lynch & Co. "But while we pull in our horns, we can't forget about the innovative things we need to do to be more efficient."

Beefing up back office

Securities companies will have to beef up their back-office operations to deal with ever-increasing trading volumes, panel members said.

"Companies are going to have to rewrite their core systems at a cost of about $100 million over the next four to five years to keep up," said panel member Sameer Patel, information technology specialist at McKinsey & Co.

The study found that smaller securities companies are interested in increasing the speed of their trading systems, while larger houses are investing more heavily in efficient management of market data.

On the average, 24% of the companies polled said they expect to increase expenditures in expert systems technology. As expected, 40% of the larger firms said they will increase their use of artificial intelligence, compared with 19% and 20% of small and medium-size firms, respectively.

"Artificial intelligence, by and large, is oversold," stressed panel member Bill Kelvie, managing principal at consulting firm Nolan, Norton & Co. "Really, the issue is to get better use of the technology that is already there."

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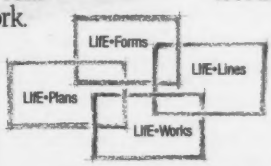

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HP users don't mind wait for Spectrum

Most say they'd rather have the RISC-based machine right than right now

BY JAMES A. MARTIN
CW STAFF

ANAHEIM, Calif. — For most, the long and often frustrating wait for Hewlett-Packard Co.'s Spectrum series of superminicomputers is still not over.

Nonetheless, attendees interviewed last week at an HP Interex User Group conference here said they remain committed to HP and "don't mind sitting tight."

"HP could have turned Spectrum out sooner, but I'd prefer they wait until it's ready," said Isaac Blake, technical support analyst for the city of Tempe, Ariz., information systems division.

Rollouts rolled back

Spectrum is the project name for HP's reduced instruction set computing (RISC)-based, 32-bit precision architecture systems, which reportedly offer significant price/performance upgrades to the HP 3000 line. The five-year, $250 million development project first promised to produce Series 930 and 950 systems by late 1986 and first-quarter 1987, respectively. The projected rollouts were snagged in mid-1986 on glitches such as an I/O software bug, pushing back shipment dates about a year.

At present, most HP customers who have recieved a Series 930 or 950 have not yet progressed beyond the testing and preliminary implementation stages, users said.

An HP spokesman said the company does not divulge shipment levels on individual systems, but he did say the orders for the Series 930 and 950 "exceeded our expectations."

"I feel like a 6-year-old at Christmas," said Arnold R. Dixon, a systems and procedures director at Celanese Fibers Operations in Salisbury, N.C., referring to the imminent arrival at his company of a Series 950.

Waiting around

Celanese is scheduled to receive its 950 in June, followed by two more before year's end. The long wait has not interfered with Celanese's data processing projects and plans, because the Series 950s will be used for implementing a new multiple-user inventory control and purchasing application as well as redundancy systems that "are not under any time crunch," Dixon said.

> "HEWLETT-PACKARD users are the most loyal in the world. A lot of users don't mind sitting tight."
>
> DONALD A. WRIGHT
> INTERACTIVE COMPUTER TECHNOLOGY

Some said the Spectrum delays might actually prove beneficial. Pacific Telesis Group, a San Francisco-based regional holding company, ordered a Series 930 more than a year ago but may no longer need it.

"We had a lot of growth for the first few years after we broke off from AT&T," said Reggie Mills, installation manager for the company's data systems. "Since we placed our order, things have stabilized to the point where it's no longer needed, and we will probably cancel our order."

Some customers said they are tempted to switch to another vendor because of the delays and their own resulting CPU crunches.

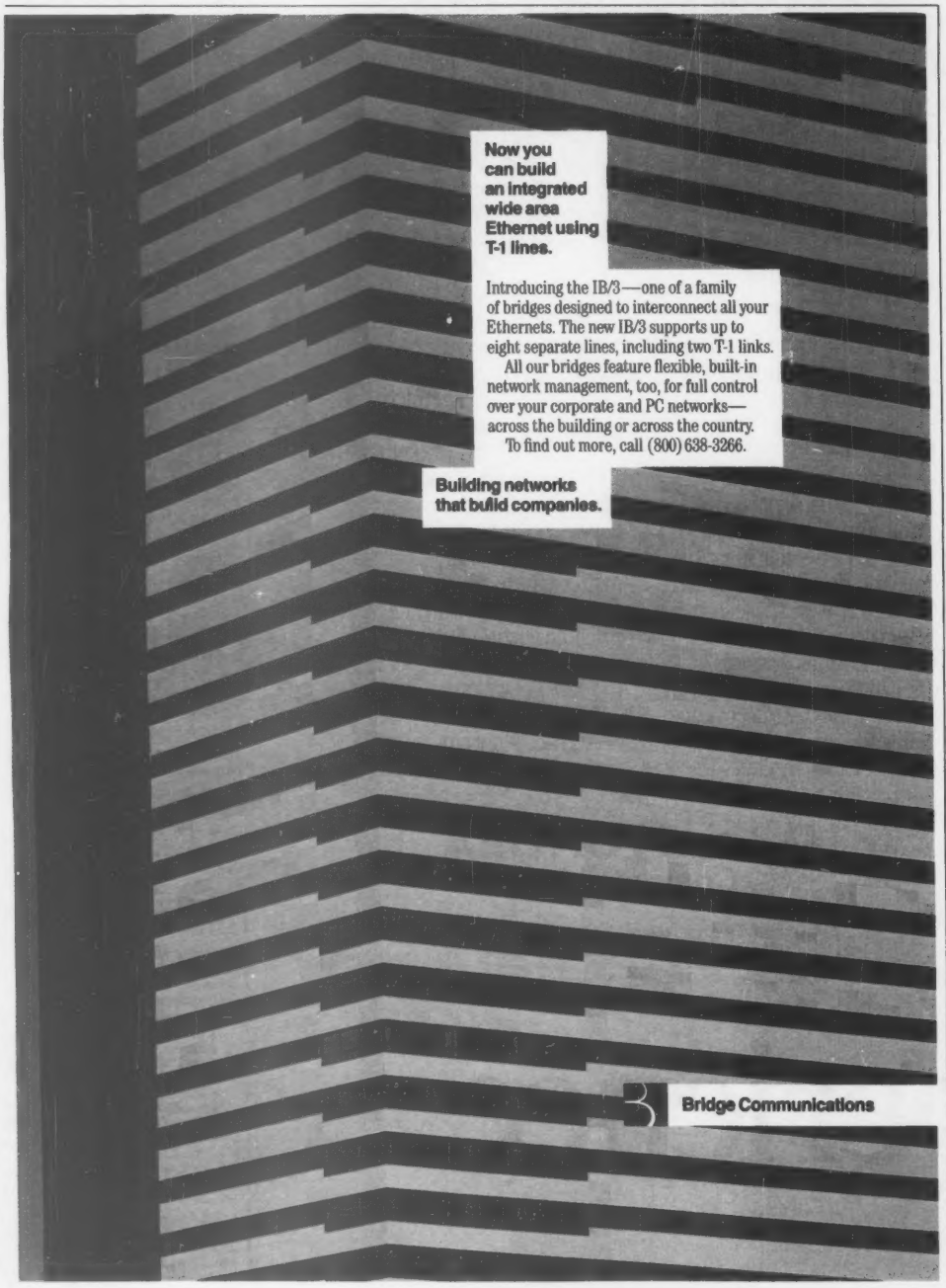
Pacific Mutual Life Insurance Co. in Newport Beach, Calif., launched in April 1987 a full-scale study on the effects of dropping HP in favor of Digital Equipment Corp. or IBM and seriously considered proposals from those vendors, according to David L. Hicks, the insurance company's senior systems consultant for applications systems.

'Maxed out'

Pacific Mutual's HP 3000 Series 70 and two Series 48 systems were "maxed out," Hicks said, and for a time it looked as if the company would have to postpone new projects and applications. The study showed Pacific Mutual could not afford to drop HP, however.

One of the most persuasive factors in sticking with HP, Hicks said, was the 80% and greater trade-in allowance HP offered to customers who bought a Series 70 to ease computing crunches until Spectrum models arrived.

In general, users said they believe the RISC-based systems will be worth waiting for. "Hewlett-Packard users are the most loyal in the world," boasted Donald A. Wright, an Interex board member and a consultant with Interactive Computer Technology in Lake Elmo, Minn. "A lot of users don't mind sitting tight."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'Lights-out' goal no nap for MIS

BY JAMES A. MARTIN
CW STAFF

LAS VEGAS — Full-scale implementation of the "lights-out" concept may still be years away, but it was the talk of the day at the eighth annual Association for Computer Operations Management (AFCOM) show here last week.

With the level of automation in a corporate data operations center expected to increase significantly in the next few years, the role of the computer operator will become like that of an airline pilot, attendees said. Repetitive tasks will be taken care of by unattended operations technologies, but the presence of a sharp mind on-site will be even more important than before, to avert potential disasters.

Lights-out environments — fully automated operations centers — are not expected to be in place to any large degree before the early 1990s. But meanwhile, computer center operations managers and staff members are facing mounting pressures to make good today on what lights-out promises tomorrow: higher productivity at lower costs, with a better allocation of resources, human and otherwise.

Future employees

Computer center operators are also expected to be better educated than their high school graduate predecessors, possess a variety of technology support skills, understand fully the nature of the companies they work for and be ready to accept other responsibilities if their jobs are eliminated or reduced in scope.

In fact, some say the computer operations staff is the most important element in a company's success or failure. Corporate America's increasing dependence on data as a means of cutting costs and keeping up with the competition brings unprecedented responsibilities to computer operations workers.

"As professionals, our responsibilities extend all the way to the corporate shareholders," said Leonard Eckhaus, president of AFCOM. "What the DP operation does heavily impacts many of the company's basic business and financial operations, which translates into profit and loss to the shareholders."

Due to a variety of factors — including fears of a recession following the stock market crash and tough competition from Japan — lights-out is increasingly being regarded as one way of keeping a line on operating costs. "This means operators will need higher skills, since more and more of their job is becoming automated," said Ray M. Ybaben, editor of AFCOM's monthly magazine.

Although most attendees interviewed said they were several years away from any full-scale lights-out implementation, the concept is causing some concern already in computer operations centers.

At Ranger Insurance Co. in Houston, the operations staff has been reduced from 22 to eight, thanks mainly to increased automation, according to James Savage, data center manager. In the past, five operators were on duty per shift; today, only two are needed.

Although several operators were laid off, Savage said, others were reassigned to different support tasks and new projects.

"Lights-out is frightening to operators because they think it's eliminating jobs, but progress usually creates new jobs," said Jerry M. Turner, chief of the Center for Disease Control's operations branch in Atlanta.

The increasing reliance by corporations on departmental computing is another opportunity for current operations staff members to find new responsibilities, attendees said.

"Often, department management in a corporation doesn't have the skills needed to care for a computing system and doesn't really want to acquire those skills for themselves," Ybaben said. "They're not interested in the computer, just the results, and this gives the operations person a new opportunity."

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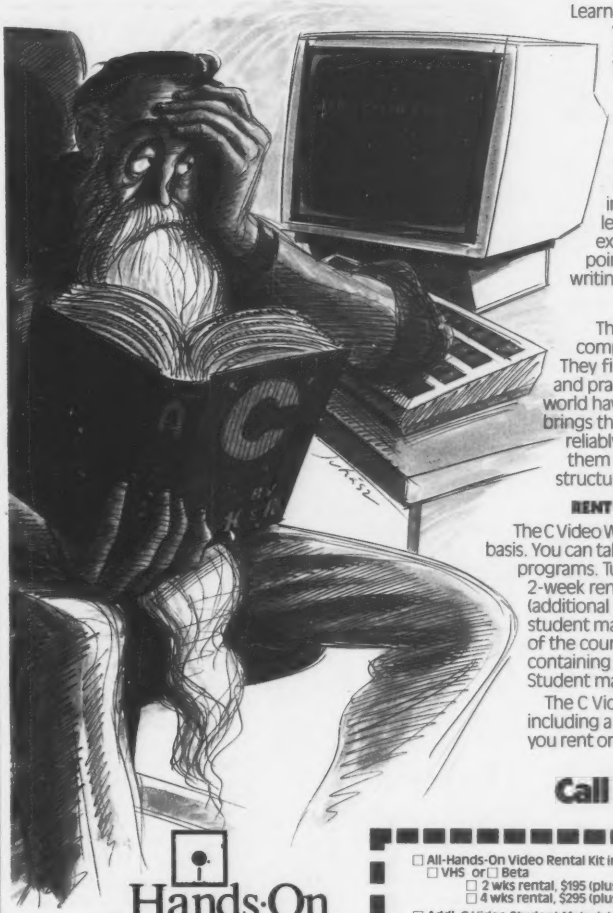

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EDITORIAL

Unisys — Take 2

WHEN YOU LOOK at the results after more than a year and a half of the biggest computer industry merger ever, it's tempting to pin the success label on Unisys. It's similarly tempting to pin a genius label on W. Michael Blumenthal, who masterminded and then oversaw the marriage of Sperry and Burroughs — as outlined in last week's special Unisys report [CW, Feb. 8].

For one thing, the sum of the two parts has not only remained financially viable but is considerably more sound than Burroughs and Sperry were individually. Credit Blumenthal with doing a masterful job in this regard. At a time when mainframes were getting a bad name on Wall Street, Blumenthal convinced the investment community that a new firm composed of two architecturally different mainframe companies could grow and possibly thrive.

Second, the widespread belief when the merger was announced that there would be mass defections of Burroughs and Sperry users to IBM, DEC and other camps has not come to pass. According to Unisys, the merger yielded what it terms critical mass, or the sheer bigness that gives comfort to mainframe buyers. In Blumenthal's own words, compared with what most people expected and with what could have happened, Unisys has done well.

Moreover, the company has maintained strength in one very key, bitterly contested market — commercial banking — in which Burroughs had been strong, despite concerted efforts by IBM and DEC to capitalize on merger-related uncertainty.

But hold off on canonizing Blumenthal or elevating the Unisys story to miracle status. The greatest tests are still to come.

A part — perhaps a large part — of the financial success of Unisys has resulted from a carefully hatched, $2 billion divestiture of some business units of Sperry and Burroughs. Actual revenue growth for this year has been pegged by some analysts at well under 5%.

Real growth in the medium and long term will have to come from mid-range systems, networking products and other areas in which the company has not traditionally been a major power.

Most critically, Unisys needs to quickly and effectively address a sense from too many users that support has fallen victim to the merger. As other companies have learned — often too late — nothing will turn users off more quickly than feeling anything short of completely coddled when it comes to support and maintenance.

Unisys must also recognize that being big should not mean being bureaucratic. There are certain aspects of smallness that users like. IBM's recent corporate reorganization was intended to eliminate bureaucracy between the company and its dealings with customers.

The company seems keenly aware of these long-term success factors. With more creative genius and a lot of careful listening to its customers, the "Power of 2" can become more than just a slogan.

LETTERS TO THE EDITOR

Word twist

To be quoted in an important publication like *Computerworld* is a special honor. Even to be misquoted in CW is an honor, albeit a lesser one. In the article "Let's see, word publishing, desktop processing — no . . ." [CW, Dec. 14, 1987], the author quoted me as saying, "Interoperability is a strategic, corporate imperative." What I said was, "Interoperability is a corporate strategic imperative."

The difference between these two statements may be egregiously subtle, yet the precision of my meaning was blunted and deformed in the misquoted version.

Thanks for producing well-written, authoritative, timely and potent information in issue after issue. The professional information services that your publication gives me are invaluable in my work.

David J. Becker
Manager of
Automation Resources
Boeing Support Division
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Seattle

The how and why

John Barnes' article, "How to spot the true colors of a rare breed — the expert" [CW, Jan. 18], left me wondering if I'm doing it all wrong.

Barnes said, "Something is wrong if the expert you hired is spending most of his time explaining what he does." Later in the article, he said, "Something is right if he starts making plans for turnover to your personnel early." Can I really handle turnover to my clients without explaining what I have done?

I have always believed that my clients should wind up knowing not only what I have done but also how and why I did it. Typically, it takes longer to communicate this knowledge than it did to solve the immediate problem. Unless my clients understand the how and why, my contribution is just a quick fix. I do not believe I can build a healthy long-term client relationship by basing it on a series of quick fixes.

Perhaps Barnes could be persuaded to write another article along the lines of "How to know if your expert did the job you needed done."

John Boddie
Unusual Software
Newark, Del.

This week in history

Feb. 13, 1978
Scientists at Pennsylvania State University use a Digital Equipment Corp. PDP-11/34 to study the motion of the human body in an effort to improve athletic performance and reduce the risk of sports-related injuries.

Feb. 14, 1983
IBM opens up to its Personal Computer users the huge installed base of Binary Synchronous Communications (BSC) protocol networks by introducing a combination hardware and software product that emulates 3270 devices running under BSC.

BSC is the most commonly used protocol on IBM mainframe-based communications networks.

Out of bounds

I protest the inclusion of such callow and sophomoric sympathies as those expressed by Buck BloomBecker in his article "On trial for willful computer sabotage" [CW, Dec. 7, 1987].

To characterize the U.S. government as in any way resembling the Third Reich is a preposterous proposition. To insult the intelligence of our federal judiciary with such drivel is a crime against reason.

BloomBecker described his fear that an elitist group of techies will become conscienceless wielders of power to the detriment of the common man and world peace. The truth as determined through experience and modern history is somewhat the opposite.

It is probably impossible to form such conspiratorial groups as would be necessary to threaten our institutions of freedom in this country. To succeed at such an enterprise, one would have to cut off the free flow of information. That is unachievable at this late date.

It is all too prevalent that an Amy Carter, Brian Wilson or Katya Komisaruk will arrogantly patronize and underestimate the common sense of the average American. With the aid of a cooperative and uncritical press, it is easy to make a flash in our media for a few moments of glory.

Bill Copenhaven
Richmond, Calif.

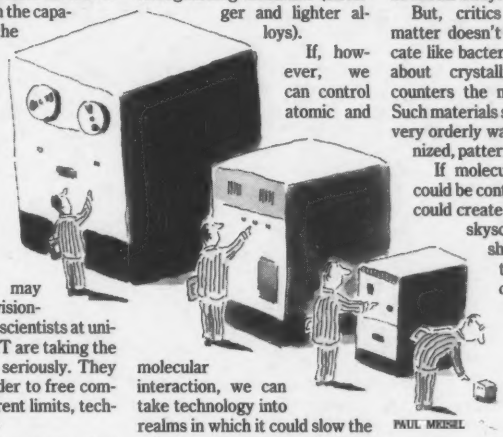
Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Computers smaller than a fly

HARVEY NEWQUIST

What's the smallest computer you can think of? Certainly not a personal computer, because you can buy laptops that are smaller. And not the typical hand-held computers, because now you can get them as small as a credit card. Credit cards are small, but a mosquito is much smaller. Bacteria are 1/10,000 the size of mosquitoes. Atoms are 1/10,000 the size of bacteria.

Imagine computers the size of a few atoms, with the capability of storing the code for constructing a skyscaper, including plumbing, electricity and air channels. That's a supercomputer thousands of times smaller than basic bacteria.



PAUL MEISEL

While you may have trouble envisioning such a thing, scientists at universities like MIT are taking the possibility quite seriously. They argue that in order to free computers from current limits, technology must be downsized past microns to atomic and molecular levels. That's 1/10,000 of a micron — nanotechnology.

The issues are explored by K. Eric Drexler in his book, *Engines of Creation, The Coming Era of Nanotechnology.*

Drexler and his supporters claim that technology is still the modern equivalent of primitive man chipping stones and bending heated metal. The most impressive advances are still related to the ways of old — using temperature (superconductors), chipping away at raw materials (smaller silicon processors) and strengthening materials (stronger and lighter alloys).

If, however, we can control atomic and molecular interaction, we can take technology into realms in which it could slow the aging process, cure diseases, help replenish the air supply and produce one of the most important instruments that man will ever use — the nanocomputer.

The underlying concepts of nanotechnology are analogous to what is going on in biotechnology. Bioscientists commonly effect changes in bacteria by injecting them with viruses to produce specific kinds of results, from growth hormones to enzymes.

The DNA structure of an organism is altered in a methodical, even predictable way. Since DNA molecules are already being manipulated within organisms, it seems to the nanotechnologist that molecular control over inorganic matter shouldn't be too far away.

But, critics say, inorganic matter doesn't grow and replicate like bacteria or cells. What about crystalline structures? counters the nanotechnologist. Such materials seem to grow in a very orderly way, forming organized, patterned structures.

If molecules of all types could be controlled, then they could create everything from skyscrapers to space shuttles as long as the types of molecules needed for bonding and building were available. How would they know the difference between them?

Precedents are already available in even the simplest biotechnology. Penicillin

Continued on page 23

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Putting information back in the center

NAOMI KARTEN

When I was an information center manager, my department was situated near the elevator so that users could find it easily without traipsing through other departments. We were the first room a visitor to the floor encountered, so people asked us for directions — to the rest rooms, to another department, to the conference room, even back to the elevator.

In the noncomputing world, an information center brings to mind just this kind of service.

The booth in the department store, the window at the train station, the little building at the rest area on the highway — all offer information to guide you on your way. If you need help in getting from Point A to Point B, the attendants don't hand you a compass or enroll you in Intro to Navigating Operating Systems. They simply tell you the best way to get from A to B.

By many other names

In the corporate world, however, information center is a strange name for what in reality acts as a service center. There are plenty of alternative labels in use: micro support center, user services center, decision support center, productivity center. Most of these names emphasize services, not information.

Some organizations deliberately depart from the information center designation because the name was introduced by IBM. If IBM says do it *this* way, they would rather do it *that* way.

Many organizations simply prefer a name that more accurately reflects their actual services, which generally include creating specialized data bases, evaluating hardware and software, establishing policies and guidelines and providing training and product support. Right from the start, they viewed themselves as something other than a center for information. One center, for example, is called hot line and training.

But users are becoming proficient in product mechanics, and the need for basic services will not last forever. To be of value to the organization for the long term, information centers need to become true information centers — one-stop shopping for expertise in the retrieval and use of computerized information to support business needs.

Requirements for guides

To provide this level of expertise, staff members need to understand and be able to communicate with others about the following:

- Corporate data, including sources, format, meaning and usage. Besides knowing the who, what and where of corporate data, the staff must understand the differences and inconsistencies among various sources of data. Seeing the big picture enables information centers to collect data from multiple sources and supply it to users in the most effective form for supporting desktop decision making.
- Sources and uses of external data bases that can be purchased or accessed to support business needs. Whereas corporate data is largely oriented toward transaction-based operational needs, external data can be valuable in providing quick access to information that can affect the direction of a company's future.
- Emerging computer technologies that may support or advance users' business needs. Staying on top of the technology is too important to be merely an afterthought, but it frequently falls off the to-do list in the scurry to fulfill other obligations.
- The range of user-developed applications. Users are spending enormous amounts of time reinventing the wheel. By tracking and cataloging selected applications from key areas, information centers can develop an application menu from which users can draw when starting a new project.
- The range of computer technology available in the company and how it is being used.
- The company's major production systems, where they get their data from and what they do with it. Knowing these systems requires a familiarity with how key data elements change as they meander through the company's key systems.
- Corporate goals and objectives and the flow of information through the company to support these goals. Information centers must aim in this direction to survive. Some forge strong links to the data administration group and are becoming knowledgeable about corporate data.

Some information centers assign staff members exclusively to technology evaluation; they concentrate on meeting with

Continued on page 23

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

FDR, JFA: Picking up the pieces

GLENN RIFKIN

That January morning in 1933: Herb Hoover tapped his derby on top of his head and flipped a quick wave to Frank D. Roosevelt. "Hey, Frankie," he said. "Good luck. It's all yours now." And with that, he popped out the side door of the White House and hopped on a train to Iowa, whistling, "Happy Days are Here Again."

In 1985, down in Armonk, N.Y., it was, as Yogi Berra would say, deja vu all over again. John Opel threw on his overcoat and patted John Akers on the back. "Good luck, Jackie. It's all yours now," he said. With that, Opel grabbed a company jet to Palm Springs, whistling, "Do You Know the Way to San Jose?" John looked around his spacious new office and noticed small cracks in the ceiling and paint peeling near the window.

Now everyone knows that Frank landed right in the middle of a big mess. Too many good times had made the old country fat and lazy, ripe for a big fall. When he took over in 1933, the downward slide was just picking up steam. Things would get a lot worse before they got better.

Jack inherited his own little country ready for a fall. Depression set in almost immediately. Too many years of good times had made Blueland fat and lazy, and, although no one believed it was possible, the fall came fast.

Suddenly, everyone was pointing at Jack. "Hey," they cried, "Blueland is the biggest and the best. It's the last great hope for freedom and high margins. What are you going to do about it, Jack? Huh? What?"

Things got worse before they could get better. Blueland's GNP — gross national prominence — dropped precipitously as the economy battered the heart and soul of its business. Wars broke out. First, armed legions from the Far East and the American Southwest attacked the flank. Then, a skilled army led by Capt. Ken Olsen struck the midsection.

No more war

Now everyone knows that Frank turned out to be a big hero. He led the forces that beat back the Depression. Of course, it took a skirmish called World War II to help old Frank work his magic.

Jack doesn't want another war in Blueland. He's already losing the few battles he's got.

So he just decided to take his little place apart and then snap it all back together. In the process, he did a bit of jiffying up, tucking in the corners and cleaning up the mess. He wants everyone to remember him as they remember Frank. He wants to be a hero.

"The only thing we have to fear," Jack says, "is fear itself . . . and delayed buying decisions and tighter margins and more clones and VAX clusters and integration and recessions and. . . ."

Rifkin is a *Computerworld* senior editor.

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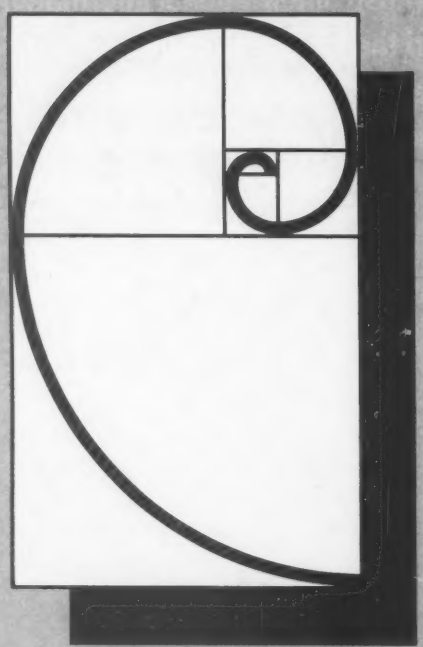
How to recognize all the companies delivering RDBMSs for on-line applications.



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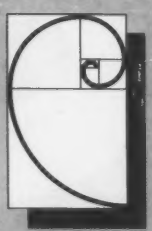

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Computers

FROM PAGE 19

affects certain bacteria but not living cells. Such selectivity should also be possible in building molecular machines.

Now consider assemblers, which are the "how" in using molecules to build things. Assemblers are molecules formed together as miniature machines to achieve a certain function, whether it be linking other molecules to form smooth-as-silk steel or forming an assembly line to create unbreakable plastic only millimeters thick. Machines so small that they are invisible could be created by linking molecules in precise formations.

More than sci-fi

Does the potential of nanotechnology begin to sound like science fiction? You can almost picture the lab scene: "Hey Bill, over here, under the electron microscope, you've got to see this — it's a fully automated GM plant, and it's turning out cars just a few molecules wide."

Nanotechnology proponents claim that there is nothing wrong with a little wild speculation. Look at how eerily accurate Jules Verne and H. G. Wells were in writing about societies decades beyond their own.

But it really shouldn't sound that far off the mark. After all, today's microprocessors contain thousands and thousands of microscopic components that form chips smaller than M&Ms. The room-size ENIAC of 1946 is already the fingernail-size Intel 80386 of the 1980s.

And that brings us to the prospect of actually creating nanocomputers. Present-day computers, built with micron technology, can't avoid molecular flaws. They also contain processors built in a two-dimensional, or flat, configuration.

In much the same way that biotechnologists create predetermined bacterial functions, the nanotechnologist could create interconnecting circuits. Arranging the molecular level of a semiconductor design would allow for more precise, three-dimensional circuitry.

Mechanical or chemical reactions could cause molecular-size computers to operate with incredible efficiencies, even though these methods are about 100,000 times slower than electric signals. However, since the traveling distance is one millionth less than that crossed by electric signals, there will be a considerable processing time improvement.

Nanocomputers would control assemblers, but what would control the nanocomputers? The answer lies in artificial intelligence. Just as computer-aided design and manufacturing takes some of the human intervention out of various design and production phases, so will the next generation of AI help to create nanocomputers and nanomachines.

Though nanotechnology is many years away from reality, its proponents tend to be some of the best and brightest in the world of computer research. They could make it happen, some think, as soon as the turn of the century.

Advances in computing power, memory and speed during the past few years have really just been alternate ways of cutting the same computer pie. You can serialize it, parallelize it, hypercube it or neurally network it. But changing its inherent molecular format — now that's radical.

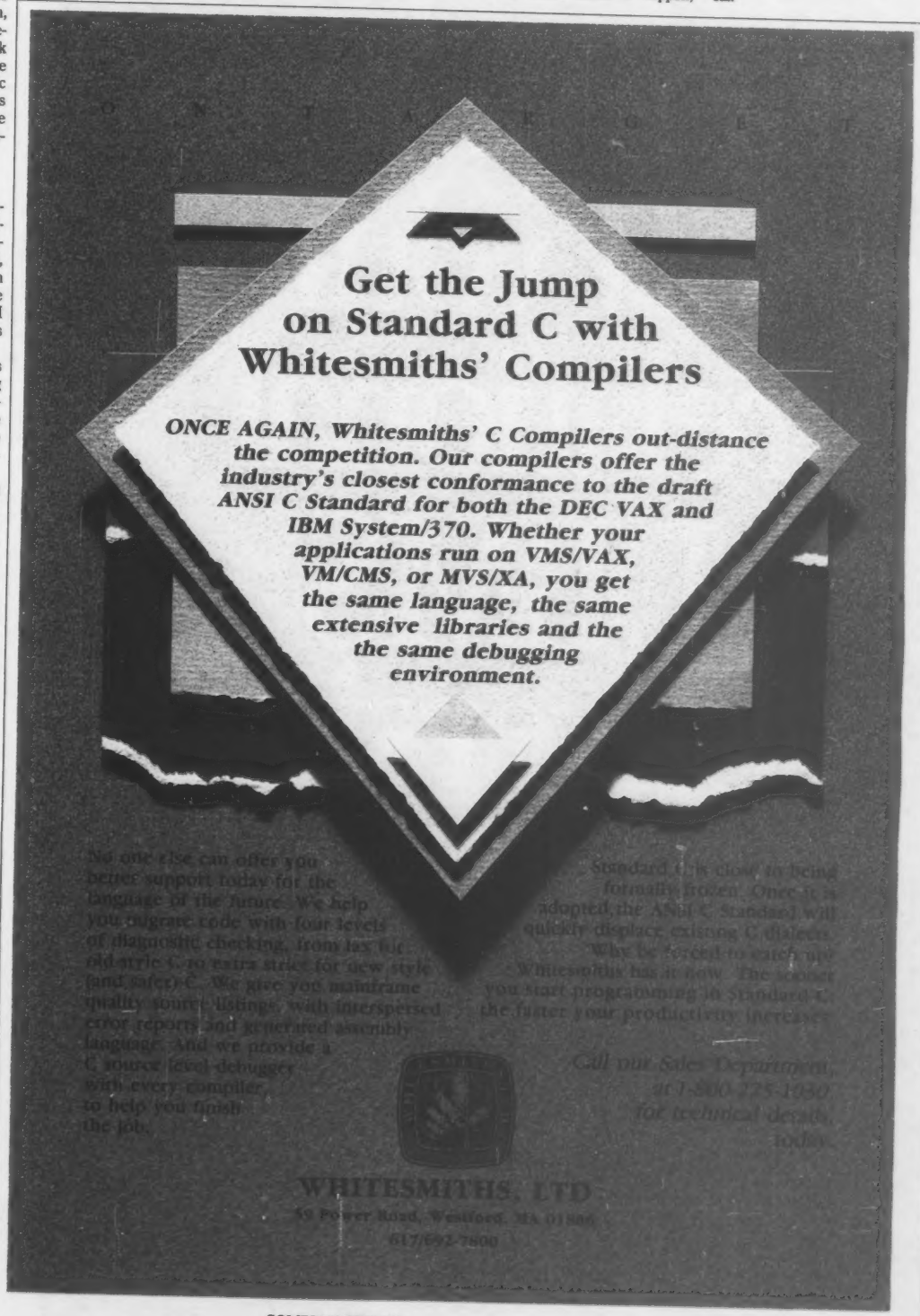
Information

FROM PAGE 19

vendors, viewing new products and assessing the benefits to be derived from these products.

Some information centers create libraries of user-developed applications, and through on-line bulletin boards and other forms of communication, they help their users avoid redoing what has already been done.

The service component of the information center that has been dominant during the last several years has been essential to support the early stages of end-user computing. But as users develop proficiency and as the current emphasis on the basics diminishes, there must be an evolution from service centers to true information centers.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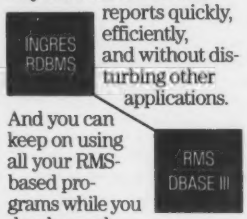

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SOFT TALK

F. Barclay Jordan

You better shop around

Many quality software applications are available as packaged software today, but selecting the right package remains a demanding task.

This burden can be eased by following these guidelines:

- **Identify the individuals who will use the software and appoint them to a section team.**

In addition to users, this team should include representatives from MIS, internal auditors and other departments that might be affected by the new or enhanced application. Ultimately, this team should monitor and support the implementation.

- **Document required features and functions in detail.**

Traditionally, this documentation effort is completed as the result of interviews. An alternative approach that is gaining favor consists of conducting a few software selection team meetings that might last for four to eight hours, the objective of which is to reach a consensus on what business functions are required in the new system.

Regardless of the approach, the first task of the selection pro-

Continued on page 27

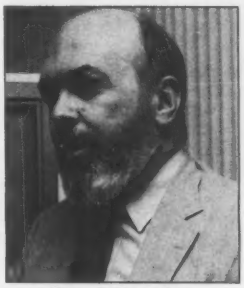
Consortium states its CASE

Plans to integrate disconnected steps of software development cycle

BY NELL MARGOLIS
CW STAFF

RESTON, Va. — A limited partnership formed by 14 leading aerospace and defense firms in search of better software is expected to yield interfacing modules this spring that work with a variety of established computer-aided software engineering (CASE) tools.

The Software Productivity Consortium was formed in 1985 by 14 companies, including Boeing Co., Grumman Corp., United Technologies Corp. and TRW, Inc. They established an independent headquarters for the group in Reston, which



Dennis Gaughan

served as the site of a recent gathering of executives from the 25 CASE tool vendors that the consortium selected as its Guest Systems Council.

Dennis Gaughan, a consortium manager, said the meeting allowed the consortium to give the CASE companies their first detailed briefing on the consortium's forthcoming developments. The CASE companies "are not part of the problem, but part of the solution," in the consortium's view, Gaughan said.

The consortium plans to use prototyping, reusable code, knowledge-based systems and software system engineering to integrate previously disconnected tools used in the software development cycle.

According to consortium

Continued on page 28

Answer adds DB2 support

CANOGA PARK, Calif. — The Answer Systems Division of Sterling Software, Inc. has added IBM DB2 support to its Mark V on-line fourth-generation development system.

The DB2 support, announced last month, comes with a $15,000 upgrade fee. The base price of Mark V is $100,000 for the IBM MVS operating system.

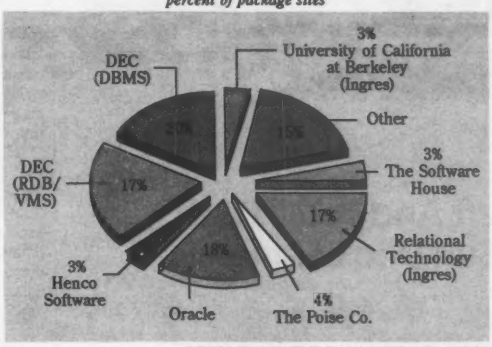
Mark V users should now be able to work with both the IBM IMS hierarchical data base management system and the DB2 relational DBMS. According to the vendor, Mark V users can join relational data with hierarchical data.

With Mark V, users can develop applications that are independent of a particular DBMS, an Answer Systems spokesman said. As a result, users can move applications back and forth between data bases. This concept, called the Logical Data View, provides a layer of definition that remains separate from the actual application. The definition can be changed to assign the application to a data base.

Data View

DEC VAX sites

Data base management system market share and percent of package sites



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SOFTWARE NOTES

IBM expands expert shell

IBM's Expert System Environment (ESE) is under continued development and will be available for use under IBM's CICS and IMS/DC before the end of this year, according to Herbert Schorr of IBM's Information Systems Group in Rye Brook, N.Y. The end-user-oriented expert system shell was introduced under IBM's VM in 1985 and made available for IBM TSO users under MVS in April 1986.

Schorr said IBM is jointly building the CICS and IMS/DC

Continued on page 28

Inside

- IBM offers Fortran conversion tool. Page 26.
- Cullinet preps DBMS that runs under Unix. Page 27.
- ADR revamps ADR/The Librarian. Page 29.

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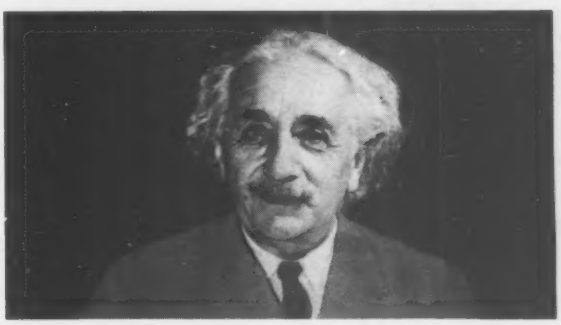

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* Emc² supports its own super-economical, multi-user environments to vastly enlarge the population that can use it. VAP is a special VTAM application for MVS and VSE; FIVS is the multi-user Fischer International Virtual System for VM.

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IBM takes up application translation

Conversion program turns CDC, DEC Fortran into IBM VS Fortran

RYE BROOK, N.Y. — IBM last week made a program available that it said converts Fortran applications written for Control Data Corp. and Digital Equipment Corp. processors into IBM VS Fortran.

The IBM Fortran Translation Tool translates source code statement-by-statement into IBM Fortran while running as a batch job under IBM's MVS or VM.

The original statements are preserved as comments in the new program. If a statement cannot be translated, the program labels it with the code "CX" for manual translation. A system editor assists in finding the output statements that need manual conversion, IBM spokesmen said.

The tool translates PDP-11, TOPS and Plus dialects of Fortran from DEC as well as VAX Fortran.

The conversion program consists of two parts: a source translator and a runtime routine, which supports date and time facility, sense switch, light simulation and CDC masking instructions in the translated program.

The tool became available on a limited basis Friday and should be generally available by July 1. It is priced from $2,400 for an IBM Group 10 processor to $9,600 for a Group 40 processor, spokesmen said.

Profs gets calendar access

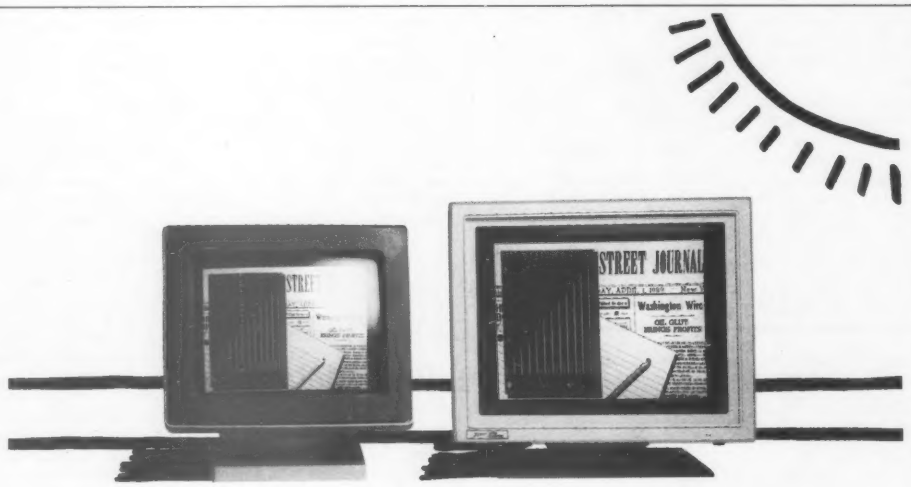
IBM also announced Version 2, Release 2, Modification Level 2 of its Professional Office System (Profs) to provide calendar access across VM systems using VM/SP Release 5 TSAF.

The cross-system calendar access should make it easier to plan group meetings for users of different systems, IBM spokesmen said. Profs calendar access can work with up to eight systems.

Profs Version 2.2 can run in the IBM VM/XA SP environment as well as the standard IBM 370 VM mode, but it continues to run in 24-bit mode under XA, according to the IBM announcement.

The updated Profs also provides support for Displaywrite/370 Release 2 and Displaywrite/370 Image and Graphics Feature printing.

Profs Version 2.2 is priced from $12,800 in Group 10 processor sizes to $32,000 in Group 40 sizes.



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The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new *Flat Technology Monitor* from Zenith Data Systems—winner of *PC Magazine's* coveted "Technical Excellence Award" in the hardware category for 1987.

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Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

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Flagship CASE package gets real-time ability

BY NELL MARGOLIS
CW STAFF

SANTA CLARA, Calif. — Visual Software, Inc. has added real-time support to its PC-based computer-aided software engineering (CASE) tool, VSdesigner.

The firm's marketing vice-president, Casey Roche, said the enhancement was made available in response to requests from the VSdesigner user base, many of whom are engineers working in control-factor-intensive industries such as aerospace and communications. Users sought automated specification and documentation of time relationships.

The VSdesigner, which runs on the IBM Personal Computer AT, Personal System/2 and compatibles, is a CASE front-end drawing and documentation package. It includes a multiuser data base that handles both hierarchical and relational structures and supports an unlimited number of decompositions, connections to objects and objects within a node, Roche said.

Offers design flexibility

The design front end is not tied to a particular methodology, input method or screen and menu format. Rather, it works with the user's choice of each.

Similarly, Roche added, VSdesigner emulates several popular word processors.

The real-time enhancement, according to Roche, supports Ward-Mellor and Boeing-Hatley methodologies. Moreover, he said, standard design methodologies, such as the Yourdon structured design method, can be combined with real-time methods in a single design.

VSdesigner's real-time extensions include symbols, such as tasks, semaphores, mailboxes and queues, as well as critical path analysis that lets users check a design path to make sure a program operates within designated necessary time constraints.

VSdesigner can work with any IBM Netbios-compatible local-area network that fits within 640K bytes, the vendor said.

It is available immediately for $7,500. Current customers may upgrade to the real-time version free of charge.

Jordan

CONTINUED FROM PAGE 25

cess is to document the required business features and functions. A weight should be assigned to each: for example, a score of 5 equals "absolutely required at implementation;" 3 equals "desirable at implementation;" and 1 equals "desirable at some time after implementation." Completion of this task will result in a written user-requirements definition.

• Conduct a comprehensive search for appropriate packages.

Contact software vendors, other businesses in your industry, trade associations that might provide lists of potential packages and your hardware vendor.

• Investigate the history of a vendor.

Have updates been delivered in a timely manner? Is the size of the vendor's staff sufficient to support your organization? Does the vendor have the financial resources to remain viable?

• Consider the simplest package that will satisfy your needs.

Will it satisfy your needs without modification? Will it interface to existing systems? What are the estimated execution runtimes? What are the estimated file sizes? How much disk space will be required? Does the package include a report writer, or does it interface to your existing one?

• Consider only software that can be supported by your installed hardware and your existing staff.

Never make two changes at once. Select software that fits into your overall computing and communications architecture.

• Develop a short list of two or three of the most promising vendors.

Some vendors can be eliminated based on their performance record, support capabilities or business orientation. Some potential packages can be eliminated based on missing features or functions. Other packages may not operate in the data base environment of your choice. Select two or three vendors that come closest to meeting your requirements at competitive prices.

• Ask selected vendors to demonstrate their software packages.

Some vendors offer 30-day trial periods. Others will conduct personalized demonstrations if a significant sale appears possible. If you use a trial period, develop a test plan and schedule against which you can measure results. Compare the package's capabilities with your user-requirements definition.

• Call or visit current users of the package.

Reference checking is essential. Look for firms in a similar situation in your industry. How well does the software work? Ask current users about the vendor's assistance during implementation and the effectiveness of service provided after implementation.

• Negotiate a favorable contract with the vendor.

Most vendors provide standard contracts that contain significant protection for them. Spend time to obtain special consideration for user and technical training, needed documentation, technical support during implementation and, later, ongoing maintenance. Price is important, but value is more important. Never buy or negotiate on price alone.

The risk of failure can be reduced by following a rigorous selection approach. Obtain active support from those who will use the software. Document your requirements in writing. Investigate vendors' capabilities. Select basic software that fulfills your needs without requiring modification. Confirm your selection by visiting or talking with current users.

Discipline is required to select the software that best meets your objectives rather than the software sold by the best salesman. Careful planning and thoughtful analysis will help differentiate one product from another. Software selection is a painstaking process, but it is essential for getting the right package at the right price to support a company during the software's life.

Jordan is a manager specializing in software evaluation with Coopers & Lybrand in Houston.

IDMS/SQL for Unix prepped

WESTWOOD, Mass. — Cullinet Software, Inc. recently said it plans to release a version of its Digital Equipment Corp. VAX-oriented data base management system for the Sun Microsystems, Inc. platform under the Unix operating system.

The software will be a version of IDMS/SQL, which is currently at beta-test sites. IDMS/SQL supports the IBM SQL standard.

IDMS/SQL was written in C, so moving it to Unix has not been a difficult project, a Cullinet official said. Cullinet has reportedly had a version of the DBMS running under DEC's Ultrix for a year.

In addition, Cullinet announced it will be adopting the software portability guidelines of X/Open, a group of vendors that has been promoting a standard environment for software to enable users to move applications across platforms.

Cullinet intends to implement X/Open's Common Applications Environment, which is based on existing standards such as AT&T's Unix System V Interface Definition.

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Expert shell

CONTINUED FROM PAGE 25

versions with some customers. IBM will continue to develop and market both ESE and a programmer-oriented shell system called Knowledgetool, even though the company is encouraging third-party shell vendors to move their systems to IBM environments, Schorr said.

Speaking of artificial intelligence, Dennis Yablonsky, president of **Carnegie Group, Inc.** in Pittsburgh, said **IBM** wants third-party vendors to think in terms of developing applications in Knowledgetool as well as move their systems into mainframe environments.

The Knowledgetool inference engine can be called by Cobol, Fortran or PL/I programs, making expert systems written in it easily accessible from mainframe applications.

"IBM would love to see expert systems in Knowledgetool that would work with a Hogan banking system, COPICS or the IBM health care system," Yablonsky noted. COPICS is IBM's Communications-Oriented Production Information and Control System.

Information Builders, Inc., seeking to spread the gospel of its Focus fourth-generation language and data base management system, has established a publishing subsidiary to produce, among other things, the "Focus Systems Journal." The journal will reportedly air articles on coding techniques and internal operations of Focus.

Users of the **Ingres** relational DBMS from **Relational Technology, Inc.** can now access their data through Information Builders, Inc.'s Focus via an interface developed by the two companies.

Arthur Andersen & Co. has included **Cullinet Software, Inc.'s** applications in its software demonstration and training program. Cullinet's application development products, ADS/Online and Application Expert, will be installed at the accounting firm's Advanced Systems Development Center in Chicago.

Candle Corp. has acquired Intercept, an IBM MVS automated operations product from **Compucept, Inc.** Candle is starting to market the product as AF/Operator. Candle currently distributes the Omegamon family of performance monitors.

Unisys Corp. has added **Knowledge Systems'** KEE PC-Host to its Knowledge Systems family to allow users to develop expert systems under Unix on a personal computer.

Relational Technology, Inc. and **DB/Access, Inc.** will jointly market DB/Access' Access/Star line. Relational's customers can use the product to employ SQL commands for loading data into the Ingres DBMS from remote systems. The data can be located on IBM mainframes, Digital Equipment Corp. VAXs or Hewlett-Packard Co. HP 3000s, Relational said.

Oracle Corp. will jointly develop a relational data base management system and related products for use with **Convergent Technologies, Inc.'s** CTOS operating system.

Consortium

CONTINUED FROM PAGE 25

President Howard Yudkin, the consortium exists to identify the elements of an optimum CASE environment, outfit it with the best existing tools and build the rest.

Harnessing technology

Toward that goal, the first consortium product is slated for spring delivery. Called Build 1, the package will introduce the data harness, a data exchange facility that reduces the need for conversion between various tool formats, increasing efficiency and cutting down on redundancy and error, according to vice-president of product development Jonathan Addleson.

The data harness will work with a variety of existing CASE products, the group said. Four "Build" tools are planned during the coming year to make up what the consortium calls Product Set 1.

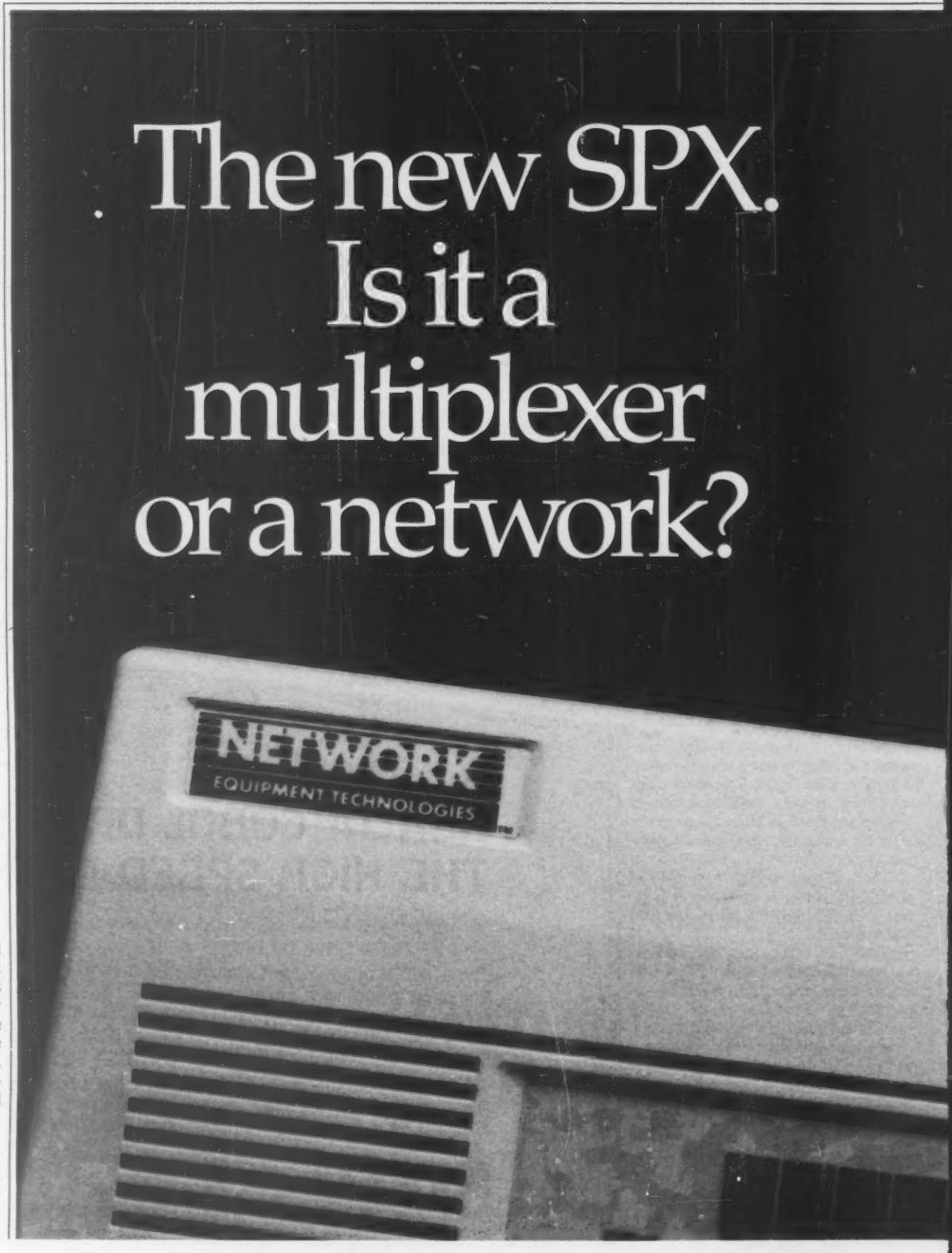
The group plans to offer all its products commercially. According to Gaughan, "an open system like this won't inhibit competition — to the contrary, it will stimulate it."

No one company can produce a full CASE environment, Gaughan noted. "If companies continue to pull separately and talk to no one else, then the user is going to be faced with making a major investment in a system that he has to try to force-fit to his needs."

In contrast, he said, the consortium approach "could reduce the price of software, reach more users through economies of scale, stimulate rather than inhibit competition and put an end to the Tower of Babel that's now going on."

Louis Mazzuchelli, president of Cadre Technologies, Inc. and a guest at the recent gathering, said the CASE companies were intrigued if not 100% convinced of the consortium's plan. Many worthy goals were stated, Mazzuchelli said, "but I don't think anything was abundantly clear."

The 25 participants in the consortium's Guest Systems Council include Sun Microsystems, Inc., Apollo Computer, Inc., Digital Equipment Corp., Index Technology Corp. and Cadre Technologies.



NEW PRODUCTS

Systems Software

An enhanced version of **ADR/The Librarian**, which extends change control to the IBM VM/CMS-ISPF environment and provides native VM/CMS support, has been announced by **Applied Data Research, Inc.**

Release 3.7 enables The Librarian to manage the update cycle of production source code to ensure source-to-executable synchronization in VM/CMS environments. The facility can be activated without a guest MVS or VSE operating system or shared direct-access storage devices. Also included in Release 3.7 is a file-comparison program for MVS environments.

ADR/The Librarian Release 3.7 is priced at $25,000 for VSE or VMS and $59,900 for MVS environments.

Applied Data Research, CN-8, Route 206 and Orchard Road, Princeton, N.J. 08543. 201-874-9000.

National Business Systems, Inc. has enhanced its **Toss Office Support System** office automation product.

Version 2.0 includes enhanced outside system interfaces that allow users to connect the communication environment with outside sources, system interfaces including a bulletin board feature and document archiving and recalling and added security features. Performance enhancements include immediate notification of messages. Other enhancements include IBM MVS/XA support, CICS command-level support, master index cleanup and disk utilization statistics.

A DOS/CICS version costs from $15,000 to $30,000. An MVS/CICS version costs from $18,000 to $72,000.

National Business Systems, Avon Park S., 30 Tower Lane, Avon, Conn. 06001. 203-677-8396.

Duquesne Systems, Inc. has enhanced its SAS Institute, Inc. SAS System-based **Billing Data Base Facility** (BDBF) billing and charge-back system.

Release 2.4 includes an interface to load data sources from Merrill Consultants' Expanded Guide to Performance Evaluation, a system tuning and capacity planning tool that writes information to SAS data sets.

Enhancements to the SMF component of BDBF include step accounting, device connect times and improvements to software charging, print processing and suspense processing.

Other features include job accounting from multiple sources, accumulation of resource use measurements, calculation of charges, detailed invoices and generation of invoices and account summaries.

BDBF Release 2.4 costs $22,500.

Duquesne, 2 Allegheny Center, Pittsburgh, Pa. 15212. 412-323-2600.

Hewlett-Packard Co. has introduced **HP Business System Plus**, software designed to integrate personal computers and HP 3000 business computers into a centrally managed system.

The software incorporates utilities said to enable HP's PC and Workgroup software applications to be centrally downloaded and managed from the HP 3000. Workgroup software reportedly provides services such as electronic mail and access to minicomputer data bases to all users on a network.

The software comes on a single HP 3000 tape. It includes host-based communications; data retrieval; resource sharing utilities; and the HP Vectra Office Professional Pack, featuring spreadsheets, word processing, graphics and PC-based communications applications. Prices range from $29,220 to $65,570.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

Dynasoft Corp. has announced an option that reportedly allows its mainframe-based **Dynasoft Integrated Software System** to access IBM's DB2 for MVS/TSO environments and SQL/DS for VM/CMS environments.

Dynasoft users can display the names of fields on record from DB2 and SQL/DS data bases and create selection criteria for access to specific information contained in data base files. The data can then be organized into spreadsheet format with the Dynaplan mainframe spreadsheet or generated in text format with the Dynaword word processing component.

The option ranges in price from $2,000 to $9,000

Dynasoft, 6300 River Road, Rosemont, Ill. 60018. 312-696-4440.

Software Products & Services, Inc. has ported its **EPOS** computer-aided software engineering environment to the Motorola, Inc. 68000/68020 processor family under the Unix operating system.

EPOS is an integrated project support environment with development and project management support capabilities. In addition to the assistance provided in all phases from requirements to maintenance, including code generation and code feedback features, it provides general import and export capabilities to incorporate other tools or to operate in a corporate support environment.

EPOS is priced from $10,500 to $42,500 depending on host system.

Software Products & Services, 14th Floor, 14 E. 38th St., New York, N.Y. 10016. 212-686-3790.

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AT&T Systems, Inc. has released **Benchmaster Version 1.2**, an upgrade to its work load emulator for Unix systems.

In external mode, it can turn a Unix machine into a Remote Terminal Emulator or Remote Workstation Emulator. In local mode, it functions as a response time monitor on a Unix system.

Enhancements include an Automatic Script Generator said to cut benchmark script writing time and new script generation commands.

AT&T also announced **GSA Standard Libraries Option Version 1.0**, designed to help with General Services Administration-compliant benchmarking in live test demonstations.

Benchmaster Version 1.2 costs from $2,500 to $8,000 depending on the system configuration. The optional libraries cost $2,500 for each copy of Benchmaster.

AT&T Systems, 12904 Olivine Way, Silver Spring, Md. 20904. 301-384-1425.

Applications packages

Document library management and review software called **Docuforum** has been announced by **Network Technologies International, Inc.**

Docuforum is a document development and management software product said to allow users to collaborate, create, review, transfer and manage documents electronically. Docuforum maintains a systematic archive of every draft.

Docuforum consists of Microsoft Corp. MS-DOS Forumlink workstation software and a document server based on either a host computer running AT&T's Unix System V or a personal computer running The Santa Cruz Operation, Inc.'s SCO Xenix. Prices range from $1,500 to $12,000.

Network Technologies, 315 W. Huron, Ann Arbor, Mich. 48103. 313-994-4030.

A computerized maintenance management software system for use in physical plants has been announced by **Logic Sciences, Inc.**

The software, called **Technical Equipment Analysis Manager**, or TEAM, monitors equipment within a physical plant and alerts operators or maintenance staff members when a problem occurs. It also generates work orders and advises technicians on repair strategies.

TEAM is written in C and runs on most systems, ranging from IBM Personal Computer ATs to mainframes running Unix, IBM's MVS and DOS and Digital Equipment Corp.'s VMS. It interfaces with the physical plant's distributed control system to monitor plant equipment in real-time. TEAM is composed of seven basic modules that can be purchased individually or as a complete series.

Turnkey packages range in price from $10,000 to $38,000.

Logic Sciences, 11000 Wilcrest, Houston, Texas 77099. 713-879-0536.

Precision Visuals, Inc. has ported its **DI-3000 XPM** graphics software package to Unix-based systems.

DI-3000 XPM is said to enable application developers to build and manipulate objects using a world coordinate graphics data manager based on the output model of the most recent version of the Programmer's Hierarchical Interactive Graphics System, or PHIGS, draft standard. The package provides simulation, modeling and design functionality in a device-independent environment and includes the complete DI-3000 graphics subroutine library.

The Unix version is available for systems based on the University of California at Berkeley Unix 4.2 and AT&T Unix System V, including Sun Microsystems, Inc. workstations, Digital Equipment Corp. VAX Ultrix time-sharing systems and the Tektronix, Inc. 4132. Prices start at $5,520.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

A version of the **Snow Report Writer** for the Unix, Xenix and Ultrix operating systems has been announced by **Snow Software, Inc.**

The report writer allows users to create customized reports, forms and business graphics. According to the vendor, data from 100 application packages can be read and written to with the Snow Report Writer. File data from Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase packages, Micropro International, Inc.'s Wordstar, ASCII, some Basic and some Cobol can be used.

Reports available include columnar reports, invoices, statements, vouchers, mailing lists and labels and form letters. Instant access to file data is in the form of quick queries and reports.

The Xenix version costs $995; the Unix version costs $1,195; and the Ultrix version costs $1,295.

Snow Software, 2360 Congress Ave., Clearwater, Fla. 34621. 813-784-8899.

Languages

A group of programming languages for users of Unix-based software on the NCR Tower family of supermicrocomputers has been announced by **NCR Corp.**

The languages offered include Language Processors, Inc.'s LPI Cobol, LPI Basic, LPI Fortran, LPI PL/1 and LPI Pascal. The languages are priced from $2,000 to $6,000.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 513-445-5000.

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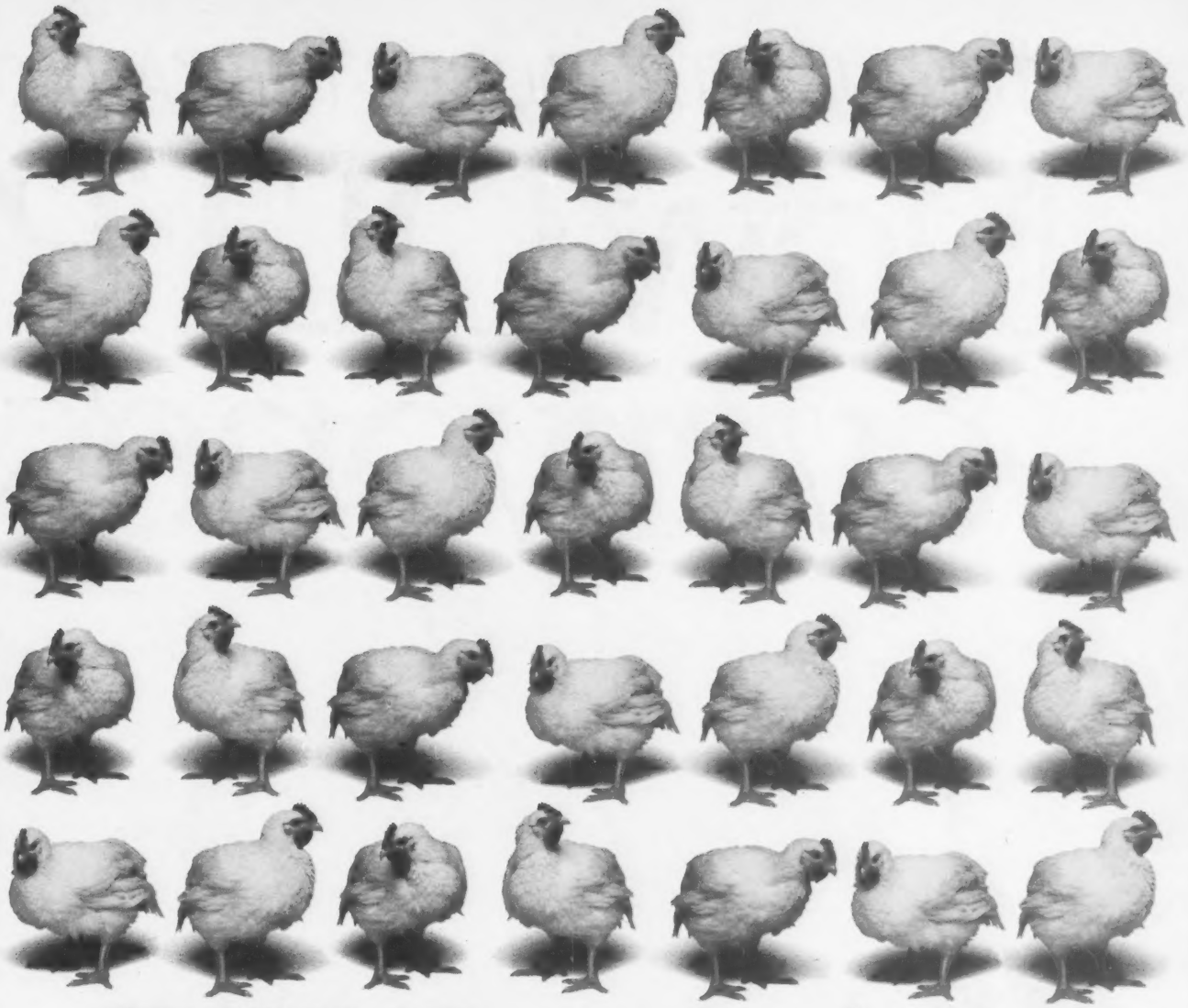

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Mr. Bill Clontz
Director of Computer Services
Holly Farms Foods

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As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

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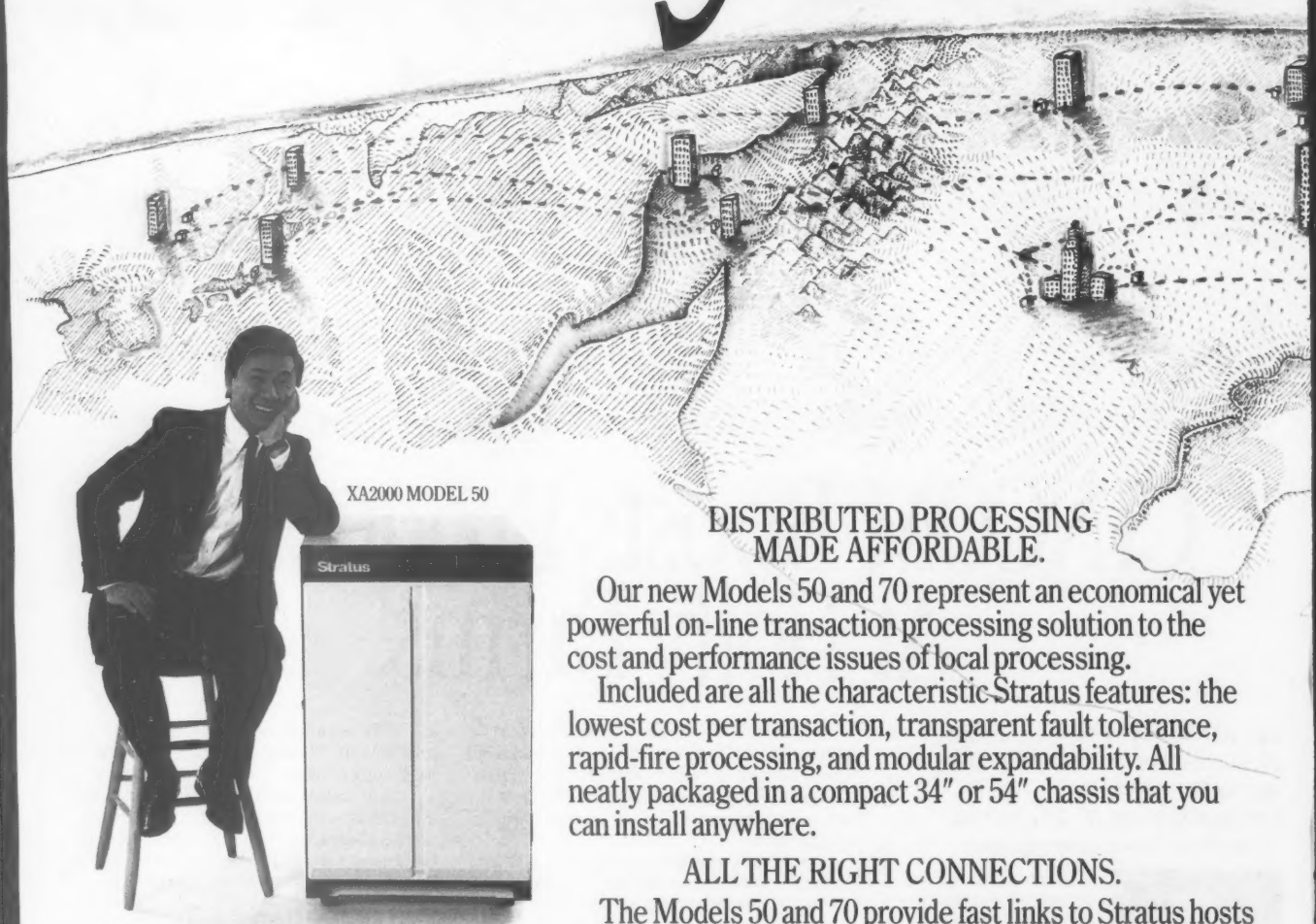

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Utilities

BBN Software Products Corp. has introduced four software options for its **RS/1** data analysis package to run on Hewlett-Packard Co.'s HP 9000 Series 300.

The options include QCA, a quality control package; the RPL Toolkit, a programming aid for RS/1 application development; Graphic Writer, a document development system; and CLI, a host language interface said to allow direct access to RS/1 files from applications written in C.

RS/1 software reportedly provides statistical analysis, data management, modeling and graphics capabilities. It also includes RPL, an integrated programming language for custom application development.

Pricing for the four options ranges from $1,000 to $6,000.

BBN Software Products, 10 Fawcett St., Cambridge, Mass. 02238. 617-873-5000.

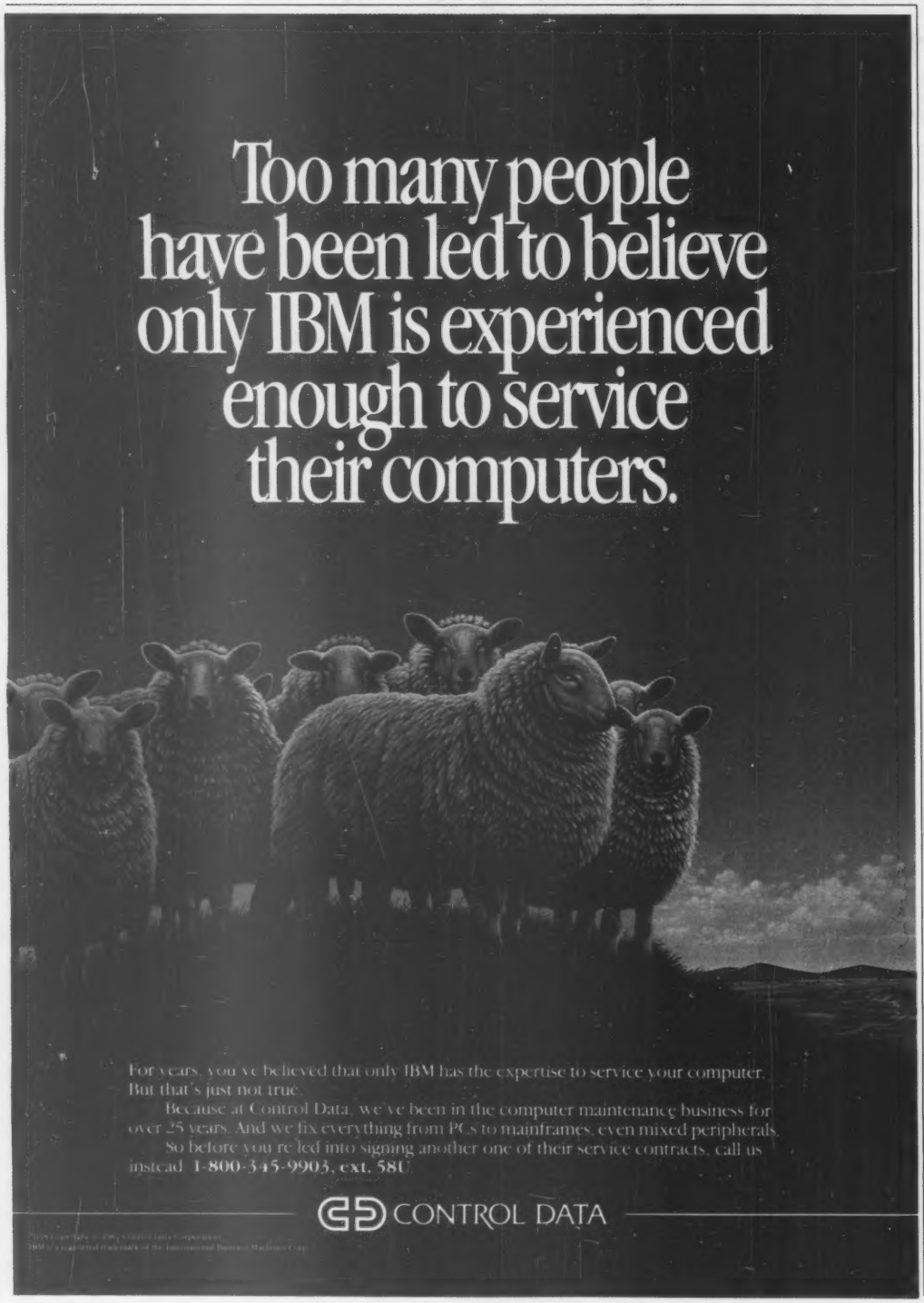
The **Da Vinci Group** of VM/Ease, Inc. has introduced two products for use in the development of relational data base applications.

SQL/DS Space/Management Utilities is a set of programs said to enhance IBM's SQL/DS. It allows estimation of the number of pages and data base space required for proposed tables and indexes as well as estimation of direct-access storage device space required for tables, indexes and defined free space. It also allows users to sample, collect and report internal performance of SQL/DS.

Dbedit Plus is said to expand the functions of IBM's Dbedit software. Users can add, delete and update multiple records in a relational data base, generate reports and tailor screens to specific applications.

SQL/DS Space/Management Utilities costs from $1,500 to $4,250. Dbedit Plus costs from $2,500 to $5,800. Both are available for monthly lease.

Da Vinci, Suite 1700, 2101 Webster St., Oakland, Calif. 94612. 415-645-1513.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CONTROL DATA

An enhanced version of **Dump**, a CICS transaction to view and modify virtual storage, has been released by **International Business Information Systems.**

Dump 2.0 includes support for IBM MVS environments under CICS/VS. It is reportedly capable of searching for literal values, providing decimal virtual addresses and displacements and is said to place makers.

Other features include security facilities for restricting use to specific terminals and users. Both hexadecimal and character display of the selected area is provided.

Support is also provided for IBM DOS/VSE environments. A perpetual license for Dump 2.0 costs $400. Current users may upgrade for $100.

International Business Information Systems, P.O. Box 15780, New Orleans, La. 70175. 504-897-3367.

Two software utilities for IBM mainframe programmers and systems analysts have been announced by **Blueline Software, Inc.**

Online Erep/VM was designed for use in error management. **VIP/VM** provides program processing information to streamline source code.

Online Erep/VM provides summaries of the data stored in the error recording area of the system. Errors are displayed on the terminal in graphic format.

VIP/VM points the source code that requires the greatest amount of processing time.

Online Erep/VM and VIP/VM cost $3,500 each.

Blueline Software, Suite 340, 1500 S. Lilca Drive, Minneapolis, Minn. 55416. 612-542-1072.

A security utility for use on IBM System/38 minicomputers has been announced by **GT 38 Software.**

Called **Security Signoff**, the program monitors and analyzes active jobs and initiates a cancel after a specified period of inactivity. The amount of time between checks and the subsystems monitored are user-defined. The program costs $150.

GT 38 Software, P.O. Box 10054, Atlanta, Ga. 30319. 404-436-9535.

MICRO BITS

Douglas Barney

SQL Server secrets unshed

What we still don't know about SQL Server. Microsoft, which kept its relationship with Sybase a semisecret for more than a year, still holds some SQL Server cards up its sleeve. Although we do know that the SQL Server uses a full implementation of SQL, runs under OS/2 and will use Ashton-Tate's Dbase as one front end, there is still much we don't know.

Here's a sample of questions recently posed to Microsoft, along with the firm's response:

- Will Microsoft develop an interface to Lotus's 1-2-3 for the millions of users who feel most comfortable with rows and columns? Microsoft won't say.
- Which Microsoft languages will be supported by SQL Server? Again, Microsoft won't say.
- Will there be IBM Advanced Program-to-Program Communications links to other host data bases? It's possible, Microsoft says.
- Will Microsoft support IBM's OS/2 Extended Edition Data Manager with development tools and front ends? Microsoft won't say.

Continued on page 43

Palantir shoots for firsts

BY DOUGLAS BARNEY
CW STAFF

HOUSTON — In what may be two firsts, Palantir Software next week is set to announce word processing programs for Microsoft Corp.'s version of OS/2 and Windows.

The products, which reportedly will sell for $495 each, are set to be announced Wednesday, when Compaq Computer Corp. announces its version of OS/2.

Microsoft plans to announce a version of its Word for OS/2, but that product should not ship until the third quarter. No firm other than Palantir has announced a high-end word processor for Windows.

Dubbed Powerwriter, Palantir's OS/2-based word processor takes advantage of the large memory capabilities provided by OS/2, allowing users to place large text files in active memory. As a result, the performance of such functions as repaginating, searching and reformatting should be improved, the firm said.

Palantir originally did a simple port from its Microsoft MS-DOS word processor to OS/2 but soon realized that OS/2 provided little extra value. The firm took the opportunity to optimize the product for OS/2.

"We realized that you can do things in OS/2 that you can't do in MS-DOS," said Charles W. Mitchell, director of publishing operations for Palantir. "For instance, you can use the same code to do two different tasks at the same time, such as printing while editing."

Powerwriter will ship by the end of March, a company spokeswoman said.

Beat Microsoft to punch

Palantir is billing the Windows product, set to ship later this month, as the first full-featured word processor for Windows. Windows itself includes a sparsely featured word processor called Windows Write. Microsoft is rumored to be developing a high-end Windows-based word processor, but that product would not ship anytime in the near future.

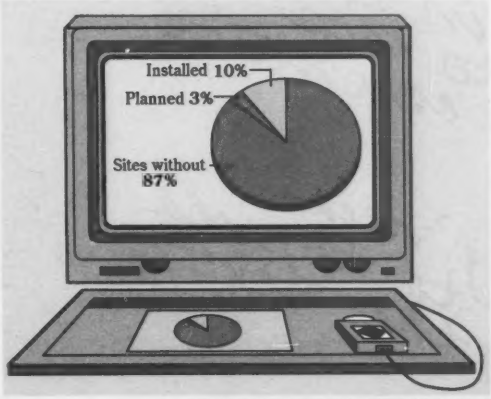
Palantir's Wintext includes advanced automatic indexing and alphabetical sorting features and what-you-see-is-what-you-get capabilities. Also, users can merge text with graphics and have the ability to view an entire page in a compressed mode.

Users can edit up to four documents at once in four different windows. In addition, the package includes multiple Undo capabilities to correct mistakes and a reverse Undo feature to counteract an Undo.

Data View

Room to grow

Percent of sites installing or planning graphics software



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: FRANK C. O'CONNELL

Norton ships data base for OS/2 development

BY ED SCANNELL
CW STAFF

SANTA MONICA, Calif. — Peter Norton Computing, Inc. recently began shipping its On-line Programmer's Guide to OS/2 Kernel API, claiming the product is just the second package available that works under the protected mode of IBM and Microsoft Corp.'s OS/2 operating system.

The program, an OS/2 data base that can be called up as a movable Help window, was designed to provide developers with programming tips and information.

The company claimed the software contains many of the tools that programmers commonly reference in the 10 volumes of OS/2 manuals.

"So instead of rummaging through pages of books for information, it is now available with just a few keystrokes," said John

Continued on page 44

Inside

- DEC won't give up on the low end. Page 39.
- How much do you know about benchmarks? Page 39.
- Forecast calls for Snow Report Writer network version. Page 46.

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Report from Beta Site User

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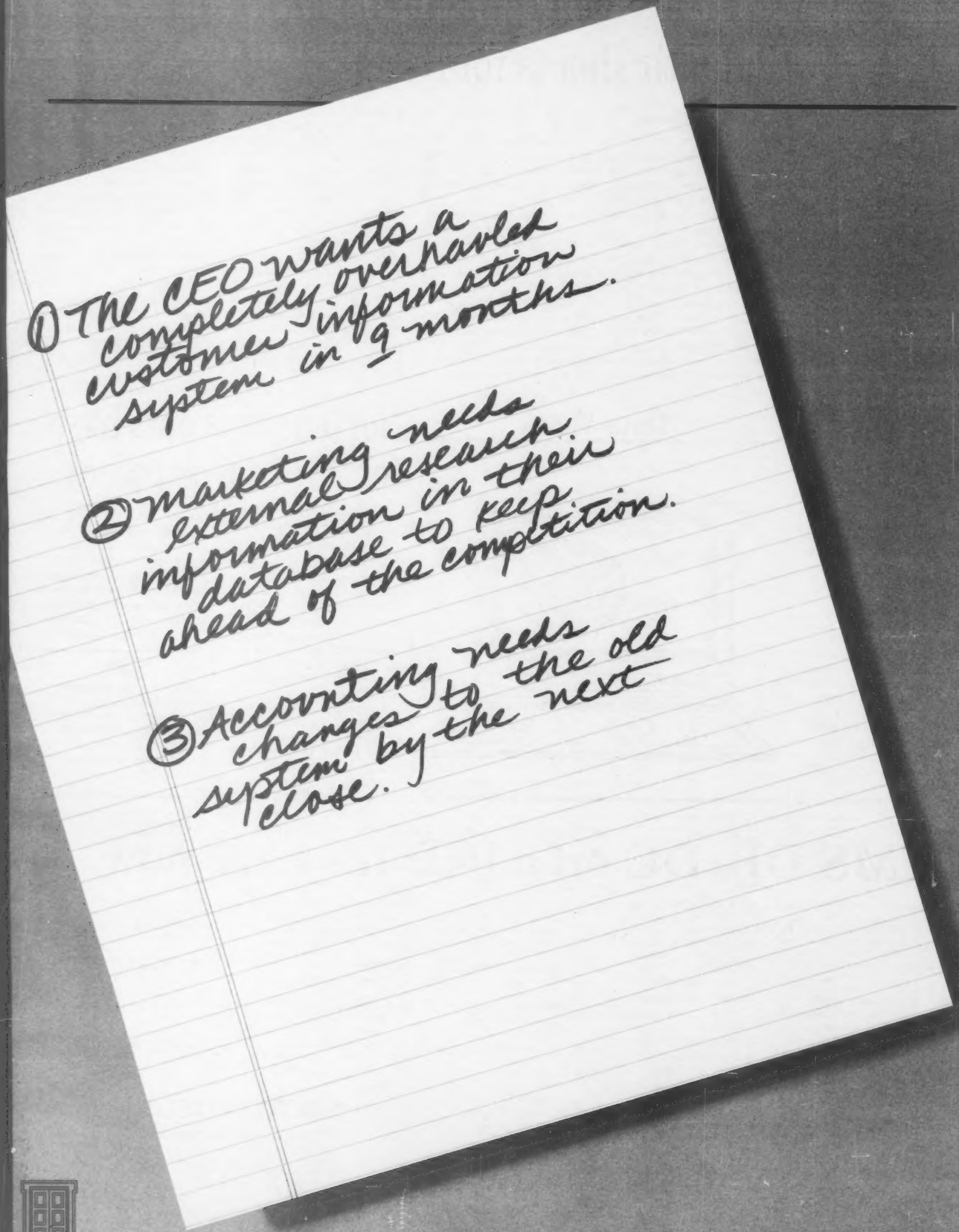
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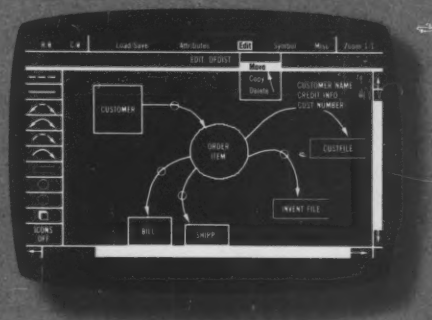

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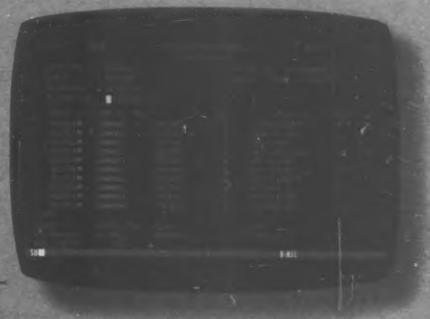

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SMALL TALK

William Zachmann

OS/2: The plot weakens

Last week, I discussed the problems users may face in getting OS/2 to run on anything other than state-of-the-art hardware. Now I question whether OS/2 is even worth the transition.

As I pointed out last week, IBM's OS/2 Standard Edition 1.0 costs a lot, requires more resources than most systems have, is complex and more difficult to use than IBM's PC-DOS and only runs in character mode.

The benefits that would justify the additional resources to run OS/2 aren't likely to appear for some time. The longer this takes, the greater the chance that newer alternatives will have appeared that will better fulfill the charter of OS/2.

The three main features of OS/2 are the graphical user interface of its Presentation Manager, which is expected later this year; access to the 16M-byte address space of the Intel 80286 chip; and multitasking.

But there are many other ways to get these features. Microsoft's Windows 2.0 and Windows/386 already offer a graphical user interface identical to that promised late this year with the Presentation Manager. And the Apple Macintosh has long offered an effective graphical user interface.

Access to larger memory — beyond the 640K-byte DOS limit — is already available from many sources. As many of these products can make full use of the addressing and memory management capabilities of the Intel 80386 processor, they can go well beyond OS/2's capabili-

Continued on page 42

Developers hope for slow, steady acceptance of multiuser SQL Server

When Microsoft Corp., Ashton-Tate Corp. and Sybase, Inc. announced their alliance on a new product called SQL Server several weeks ago, the industry collectively sat up and took notice.

IN PERSON

SQL Server is, after all, a potentially standard-setting data base engine for local-area networks, especially if the two-million-strong installed base of Ashton-Tate Dbase users decide to buy into it. The product is slated for release in the second half of this year.

David Kaplan, Microsoft's SQL Server product manager, recently spoke with *Computerworld* senior writer Alan J. Ryan about what SQL Server means for corporations, product acceptance timetables and the product's capabilities.

DOUG WILSON

Microsoft's *David Kaplan explains SQL Server*

What does SQL Server mean in the long term for tying firms together?

Local-area networks mean that work group computing will be supported in the future in the way that multiuser time-sharing has been supported in the past. Within the work group environment, you still get the kind of powerful, shared multiuser services, but with an intelligence and richness in user interface that you haven't been able to get in the traditional character- or terminal-based environment talking to a centralized host.

Does the emergence of this product mean that there could be a time when corporations will need fewer mainframes?

That's largely something that is going to be determined by the marketplace. The cost comparisons right now between [millions of instructions per second] in the area of large-scale computing or even on proprietary minicomputer architectures seem to be dramatically different from the cost performance comparisons on 80386 boxes.

The 386 by itself obviously can't do it alone; it needs the kind of high-performance I/O that you'd typically have to turn to large-scale systems for.

Who will be able to develop products to work with SQL Server?

Anyone who is in the business of software development. We really anticipate two primary constituencies, the first of which is the independent software ven-

Continued on page 42

Prime supermicro finds home in varied firms

BY ALAN J. RYAN
CW STAFF

NATICK, Mass. — The ability to run both Unix and Microsoft Corp. MS-DOS programs, along with its file server capabilities, has prompted some users to purchase Prime Computer, Inc.'s EXL 316 supermicrocomputer.

At Amdahl Corp., the mechanical engineering department is using the EXL as a file and peripheral server. Garment manufacturer Byer California in San Francisco is using one EXL to run corporate applications to manage real estate and another as a front-end server to its superminicomputers.

Reseller Tridata Corp. in Allentown, Pa., is using the EXL in-house for accounting and distribution tracking. It is also packaging the hardware with its own software and marketing the product to government and commercial accounts.

Prime began shipping the Intel Corp. 80386-based supermicrocomputer, which runs both AT&T's Unix System V, Release 3 and MS-DOS programs, last June. It communicates with the Prime 50 Series and other vendors' host systems via IEEE 802.3-standard Ethernet run-

Continued on page 43

EXL 316

Price: Starts at $15,900

- Intel 80386, 16 MHz
- 90M- and 258M-byte formatted 5¼-in. Winchester disk subsystem
- SVID-compliant implementation of AT&T's Unix System V, Release 3
- Can run MS-DOS programs simultaneously via Merge 386

Can DEC gain success in low end?

BY GLENN RIFKIN
CW STAFF

ANALYSIS

Unstated but central to Digital Equipment Corp.'s recent agreement with Apple Computer, Inc. is the fact that DEC has failed to produce a successful desktop machine of its own.

Despite the official recognition of Apple's Macintosh, Ken Olsen and DEC are still not giving up on the low end. Sometime before September, DEC is slated to unveil the Personal VAX, a VMS-based desktop machine that will once again put the firm into the personal computer fray. Already, industry analysts are scratching their heads as to what DEC could possibly be thinking about now.

The Personal VAX was conceived by DEC's Low-End Systems Group in February 1987. The idea then was to get a machine out — the first choice being a scaled-down version of the Vaxstation 2000 — by November 1987. By slimming down VMS and using a subset of it, as was done with the Microvax, DEC could conceivably put VMS on the desk top at prices competitive with IBM's Personal System/2 series.

Internally during that time period, DEC was forecasting that the PS/2 and its OS/2 operating system delivery dates were going to slip badly. "We thought they might spend years trying to get it to really work right," a former DEC engineer close to the project says.

The marketing angle was to suggest that VAX on the desk top was the best solution for DEC shops. If these corporate offices were already "stuck" with IBM Personal Computers, DEC would support them as well by offering the PC-compatible Vaxmate.

Continued on page 44

Test your benchmark knowledge

BY FABIAN PASCAL
and RICH FINKELSTEIN
SPECIAL TO CW

This is the conclusion of a three-part series.

In the first two parts of this series, we discussed various issues concerning the benchmarking of SQL data base management systems. Now we will delve into specific areas concerning when to consider developing a custom benchmark and how to make more effective use of generalized benchmarks.

First, a benchmark should include a test for loading a table. Although an optimizer does not affect this particular test, there are other factors to consider.

Some SQL DBMSs create a transaction log that contains an image of all rows that are inserted during a load. This adds some performance overhead, which may be worthwhile if the DBMS allows you to restart a load at some arbitrary point, such as if the load process is interrupted by a system or program failure. If this facility is not available and the load must always be restarted from the beginning, then the logging process should be turned off during load test.

The amount of time required to load a table may not be important if you only intend to load a table once. On the other hand, if the table will be reloaded periodically, loading time becomes more important. There may be

Continued on page 45

Top sellers

Software: Feb. 1-5

1	Lotus 1-2-3
2	Ashton-Tate Multimate Advantage II
3	VM Personal Computing Relay Gold
4	Lotus 1-2-3 (upgrade from Release 1A to 2.01)
5	Fifth Generation Systems Fastback
6	IBM Displaywrite 4
7	Ashton-Tate Dbase III Plus
8	Crosstalk Communications Crosstalk XVI
9	Microsoft Word
10	Wordperfect Library

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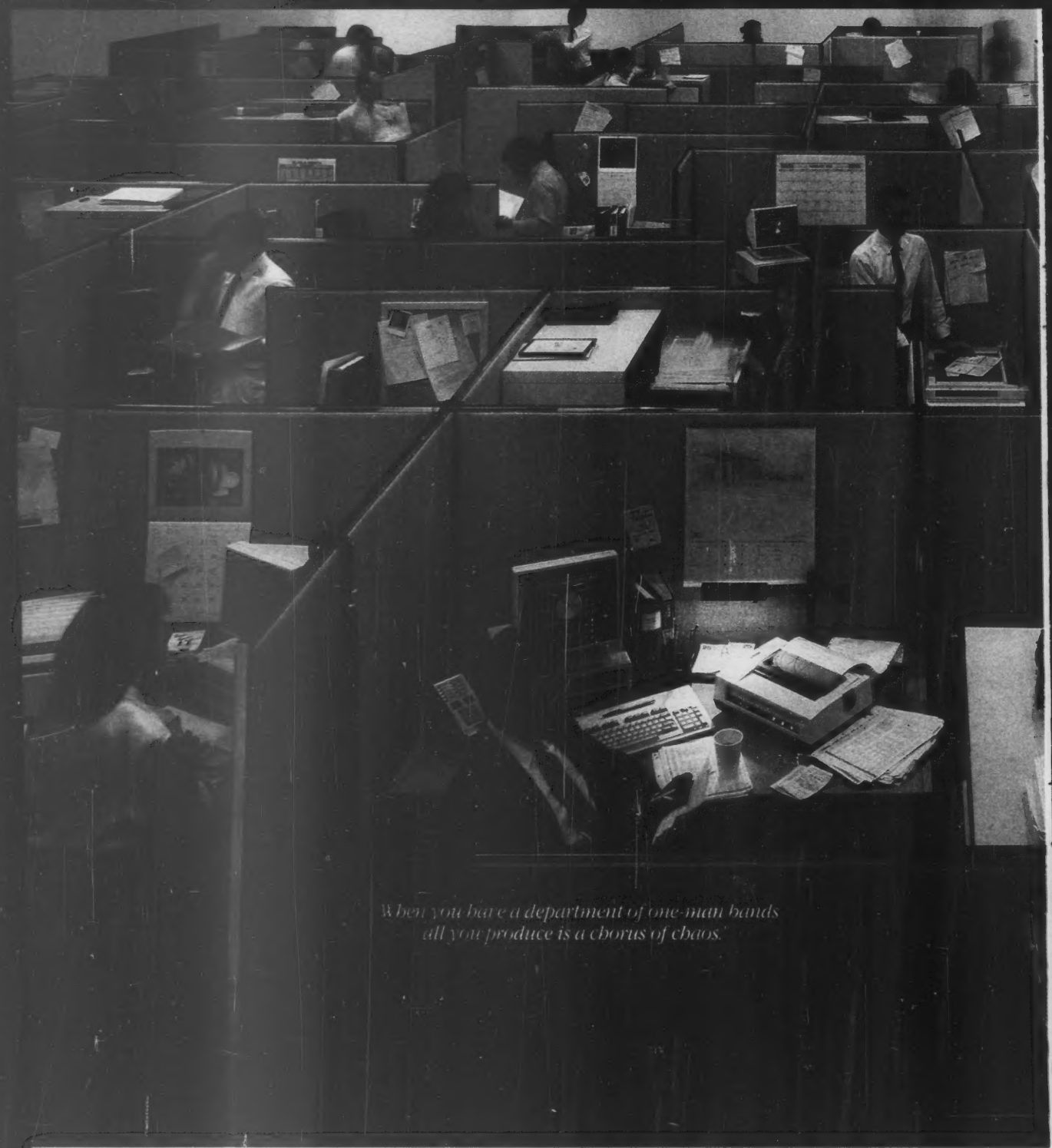
CW CHART



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Zachmann

FROM PAGE 39

ties. In addition, some of these already offer multitasking.

Sure, I've got OS/2 up and running on a test machine, but I'm not sure I will ever make it a part of my normal use of personal computers. It is at least possible that alternative means will continue to meet my needs.

Should my case be the norm, then it is not likely that OS/2 will ultimately replace MS-DOS. On the contrary, it is quite possible that MS-DOS-based alternatives could be the dominant desktop operating environment for the indefinite future.

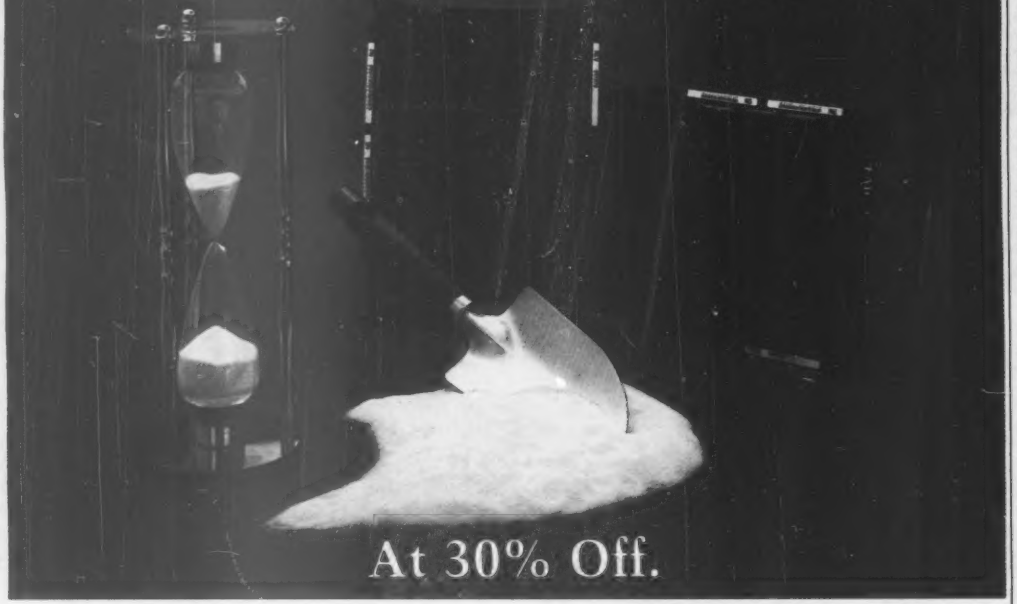
Does this mean that I think OS/2 will prove to be another product like IBM's Topview?

No. It means that it may not be until a successor to OS/2, built for the 386, is in place, that OS/2 will finally amount to much. The 386 version would avoid the problems of the "brain-damaged" 286 chip and would offer even more memory and full multitasking of existing MS-DOS applications through the 386's virtual mode.

If this scenario proves correct, the strategy for large users would be to bypass OS/2 on the desktop almost entirely. Instead, one could use Windows 2.0 and Windows 386 where appropriate, and make full use of OS/2, or its successor, in the early 1990s when a full-function 386 (or 486) version is available.

Zachmann is vice-president of research at International Data Corp.

How to Buy Time for Your IBM 308X.



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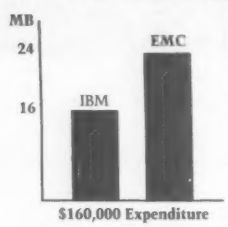

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SQL Server

FROM PAGE 39

dors. We are also going to find that the corporate community is a constituency for that tool kit.

What are the limits of SQL Server in terms of degradation?

We envision that a data base in the range of 300M bytes and a user community of maybe 35 users accessing an SQL Server will typically get subsecond response time across that entire group of users over a LAN.

Why does the performance degrade more slowly with SQL Server than with other implementations?

When standard DBMS architectures and SQL implementations schedule tasks, they defer that process to the operating system. The operating systems on any multiuser systems all have task schedulers. But the task schedulers are not optimized for a particular slot of tasks; they have to handle anything that any application program can fire at them.

Data base management systems typically fire only a very specific piece of that task spectrum out, and those are the things that have to do I/O to disk, fast reads to the disk, fast writes to the disk and things like that, as well as responding back to users. What we have done in SQL Server is take that task scheduling right into the SQL kernel itself — that part of the DBMS that partially interprets the SQL, sends it out and turns it into something that can be accessed against the data base.

How similar will SQL Server be to IBM's server product?

We differ from them in LAN orientation, which IBM has certainly committed to over time but will not be in anything we see in 1988 from them, and in our multiuser orientation and in the whole area of server intelligence.

Is SQL Server a direct competitor with OS/2 Extended Edition?

Certainly, anybody can read indirect competition in this in the sense that both of them are SQL products that run on PCs, but that's an oversimplified view. In a lot of ways, we think we're going to complementary.

How long will it be before this product is in widespread use in corporations?

Neither we nor Ashton-Tate are betting the ranch on getting rich overnight. We expect to deliver to the marketplace by the end of 1988, and we expect a slow but steadily building ramp of acceptance.

Barney

CONTINUED FROM PAGE 35

However, Microsoft will admit to planning support for IBM's OS/2 LAN Server. The firm is also adamant that a local-area network-based data base server approach is superior to a Unix-based pure-multiuser approach. We suspect some of the unknowns will provide fuel for future announcements.

The systems software conundrum. Both IBM and Microsoft seem to be redefining data base software as systems, rather than applications, software. IBM took the first step by making the OS/2 Extended Edition Data Manager part of an expensive version of the operating system.

Now, Microsoft is actively marketing SQL Server using the same rules that apply to any piece of systems software. The firm is seeking commercial developers to write applications and is going after hardware OEMs that may bundle the stuff with micros.

The goal is to have SQL Server available on as many pieces of hardware as possible, with a broad array of front-end applications. For MIS, this presents a radically different approach to evaluating software.

Until now, MIS benchmarked various data base management systems for performance, then threw development tools and existing front-end applications into the evaluation brew. If Microsoft has its way, the benchmarking may fall in importance, and the front end may become the key determinant. Meanwhile, we will just wait and see whether MIS views DBMSs as systems or applications software.

Betaware; Vaporware you can touch? A new trend among software firms is to proudly sell unfinished, or beta-test versions, of software. Under this scheme, users get to pay for debugging a vendor's software. The latest entrant to this market is Wallsoft Systems, which is shipping a beta-test version of its UI2 code generator that works with Ashton-Tate's Dbase. Of course, as with any beta-test agreement, interested users get an early peek at the software and can sometimes shape what the final version will be.

Windows all over. If our source is correct, Microsoft is up to its old tricks again. The firm that pushed vaporware to its limits with the original Windows may be pulling a repeat performance with the Presentation Manager. A version of the Presentation Manager was supposed to ship as part of an OS/2 software developers tool kit by the end of 1987 and again last month. Now we hear Microsoft is shooting for next month. The deadline is October of *this year*, guys.

No Gupta just yet. Lotus is almost, but not quite, ready to formally disclose that Lotus/DBMS is based on technology licensed from Gupta Technologies. The announcement, originally set for several weeks ago — and again for last week — has been pushed back once more. As soon as they tell us, we'll tell you.

Barney is a *Computerworld* senior editor, microcomputing.

Prime supermicro

CONTINUED FROM PAGE 39

ning Transmission Control Protocol/Internet Protocol software. Prime is also reportedly developing IBM Systems Network Architecture connectivity between the EXL 316 and IBM systems.

"We will be using [Prime EXLs] to replace all of our personal computers," said Michael Higgins, manager of technical support at Byer. He said the company is using the EXL as a front-end server to its Prime 9955 Model 2 and its Prime 2655 computers.

By running Unix with a software package called Merge 386 from Locus Computing Corp., EXL users can run character-mode MS-DOS and Unix applications simultaneously, according to Higgins. "For instance, a file on a [Lotus Development Corp.] Symphony spreadsheet can be directly taken to a Unix application or spreadsheet," he explained.

Higgins said he is using an Oracle data base management system designed for Unix from Oracle Corp. to develop many of the company's main corporate applications systems. "I anticipated at the beginning that we could run two or three Oracle DBMSs simultaneously, but I underestimated. I believe we can run six or even 10 on it."

Tim O'Rourke, CAD systems support manager at Amdahl, said he is running PC Interface, a communications software package from Locus, on his EXL. The software reportedly provides users with a transparent extension of the PC environment and acts as a file server, providing centralized storage and backup. It can also share files among multiple IBM Personal Comuters or compatibles.

Amdahl currently owns one EXL and has ordered a second, O'Rourke said. Both will be used to store a data base generated by 20 Compaq Computer Corp. Deskpro 386s and four 20-MHz Deskpro 386s.

For Byer, the EXL fit a niche, Higgins said. "A similar strategy with a lot of the 50 series machines would have been substantially more expensive, although they would have been different MIPS," he said. "Now we're forced to go out and use Unix."

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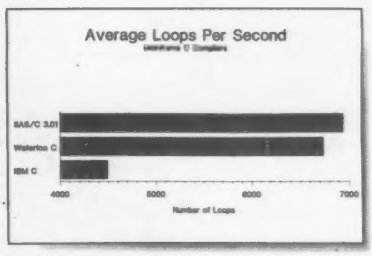

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DEC success

FROM PAGE 39

The philosophy behind the plan was that the gap between VAX applications and applications capable of running on such platforms as Intel Corp.'s 80386 or the Mac II was getting increasingly narrow. It would not matter to users whether the operating system was VMS or DOS or OS/2.

"VMS really isn't going to be visible," the former DEC engineer says, "any more than DOS is visible to most customers. The real question is, Are you going to have applications and is it a common, easily understood user interface? The days when you are going to sell the operating system per se are over."

But did DEC have the mindset to go out and get the software applications and the right windowing system in place? Would the company aggressively go after productivity tools such as Lotus Development Corp. 1-2-3-type applications for the Personal VAX?

The answer to these questions initially seemed to be no. There was constant foot-dragging on the part of the software people. "DEC has the same kind of problems relative to personal computing that IBM had relative to minicomputers," a former DEC insider says.

DEC also suffered from the "once burned, twice shy" syndrome. No one in marketing or sales wanted to get on the bandwagon for yet another attempt at a PC when the company's track record had been so poor.

Olsen had a history of getting personally involved at the low end, endlessly pushing for packaging redesigns that caused long and costly delays. Then he would reportedly come down hard on the development staff for failing.

Software from heaven

"Ken's strategy was always 'Get the box built, and the software will come from heaven,'" the former DEC engineer says.

The Personal VAX got hung up for several months on the software issue. Yet somehow, the idea survived. The hardware questions remain unanswered. The machine is reportedly diskless, but DEC is still answering the box questions. The Vaxmate, sans fan, became a nightmare for DEC developers because it simply ran too hot. Will DEC go a similar route with the Personal VAX? That is currently unknown.

When it is announced, the machine will be priced competitively, reportedly under $5,000. Though they've missed the window of opportunity created by OS/2 delays, DEC insiders say IBM and Microsoft still have plenty of obstacles to overcome with OS/2 implementation.

An industry analyst who wants to remain anonymous says he has been told that DEC expects the Personal VAX "to be a slow grow" for the firm.

John Rose, group manager for personal computing systems at DEC, would not comment on the product but said, "If you look at the history of the VAX for the past couple of years, it is logical to expect that we will continue to enhance that platform in both directions."

All for one and one for all?

No one is quite sure what the Personal VAX means to DEC's agreement with Apple. It's one thing to push Macintoshes instead of PS/2s. It's another to put the stamp of approval on someone else's desktop offering when you are about to announce a brand new solution yourself.

According to Rose, both DEC and Apple have agreed to be "friendly competitors" on the desk top. "We want to win the desk top with a DEC-logo device," Rose says.

It is unlikely, however, that the deal with Apple will affect the Personal VAX. Olsen is not known for killing products, particularly at the low end.

At issue right now, apparently, is whether to incorporate OS/2 and DOS slots on the Personal VAX. This issue has polarized the development group inside DEC, which is no surprise, considering Olsen's long-term resistance to expansion slots on his PCs.

"No decision has yet been made," one analyst reports. "When we see the blood trickle out from under the door, you'll know someone has won."

Without referring specifically to the Personal VAX, Rose says, "We will be integrating OS/2 and, if appropriate, providing OS/2 on DEC-based hardware."

In the long run, it appears that the Personal VAX will become DEC's desktop machine of choice. The Vaxmate, which has fallen far short of expectations, is still considered a strategic product, according to Rose.

But if the Personal VAX incorporates DOS and OS/2, the Vaxmate will slowly disappear. The more important question remains: Are there any desktops left out there that would provide a significant market for a VMS PC, and how and will DEC market this machine?

Norton

FROM PAGE 35

Socha, director of research and development at Norton.

The Norton Computing data base is also said to provide software developers with access to specifications and programming examples for the four OS/2 function groups, which include system and file services, keyboard services, mouse services and video screen services.

Easy access

When the Norton guide is activated, categories of information can be accessed through pull-down menus.

When a category is selected, the program presents a list of one-sentence descriptions, each of which can be expanded for more detailed information.

An interesting feature of the program is the DOS-to-OS/2 equivalency table. Norton Computing used the table to convert its own programs from DOS to OS/2, according to Socha. "It made the job a lot faster and less painful," he said.

A companion Norton Guide for the Presentation Manager, the graphical interface for OS/2, is currently being developed, according to the company.

Theirs takes hours.

Installing and configuring a 3270 or RJE remote host connection for BSC or SNA NETBIOS LANs? With the competition, it'll seem to take forever. While RabbitGATE™ takes just a few minutes. It's so easy that most people don't ever open the user guide.

But RabbitGATE saves more than set-up time. It also saves time in operation. At 56Kbs, it's the fastest LAN-gateway around. But more important—at any line speed—it performs file transfer up to twice as fast as the competition. Using only a host session, to keep your DOS sessions concurrently available to local DOS applications.

That's because RabbitGATE has its own 80186 processor and 512k of RAM. So when compared to other gateways, which downgrade your workstation, RabbitGATE saves up to 50% of your workstation's processor and RAM.

As if saving time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers built-in windowing, 8 host sessions per workstation, and access to different hosts with different

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Benchmark

FROM PAGE 39

only a limited window for when a table can be loaded or, from a usability point of view, it may important to complete the loads as quickly as possible.

For example, it may be critical that the table be loaded every morning in 15 minutes so the user is up and running by 9:00 a.m. Otherwise, the user may be frustrated and reject the system.

Retrieval tests

In a heavy retrieval environment, the tests of SQL joins are very important. It is rare that a system consists of only one table. A two-table join should always be tested, as should a three-table join.

Three-table joins are very common; a typical example is the join between a customer, an invoice and an invoice detail line table. Four-table joins are a bit rarer but should be considered.

One problem with testing joins is that it is difficult to get data that accurately reflects the real-life situation. It is also difficult to find the time required to perform all the necessary tests. Some four-way joins can take hours if the tables are very large.

You can restrict the joins to just a few rows in the tables; with the help of indexes, this would reduce time dramatically. In all cases, the benchmark should test the ability of the optimizer to use indexes. It is rare that joins are done on unindexed columns. The benchmark should also test the optimizer's sensitivity to the join condition in the WHERE clause of the SQL command.

In the following statement, we will join an employee table with a department table using the employee numbers in both tables.

```
SELECT PERSON
FROM EMPLOYEE
WHERE
EMPLOYEE.EMP_NO =
DEPT.EMP_NO
```

If indexes exist in the employee table, then the optimizer must choose which one or ones it will use. Many times, an optimizer will be tricked into using the wrong index or indexes. You may get quite different results by flipping the WHERE condition and putting DEPT.-EMP_NO on the left-hand side of the equal sign.

Better optimizers will use statistical data and histograms that are stored in the system catalog in order to determine the best index to use. In some cases, an optimizer may even decide to build a temporary index if the optimizer determines that it will increase performance.

Ordering, or sorting, is also very important in retrieval environments. It is crucial to use indexes correctly when they are available, and benchmarks should test queries that cannot use indexes for ordering. Some optimizers will build a temporary index, while others will use a vendor-developed sort program. The quality of this type of programs varies substantially from vendor to vendor.

Compound conditions

Queries with AND or OR Boolean conditions are quite common but difficult to optimize. Of the two, the OR operation is considered the one that is more difficult to optimize correctly. Good optimizers can use indexes to greatly reduce I/O.

Subqueries, or nested queries, and correleated subqueries are rarely tested in benchmarks. Many evaluators underestimate the importance of these queries and tend to ignore them.

Certain types of subqueries are equivalent to joins. An optimizer should be indifferent to the fact that a query is a join or a subquery and should be able to execute equivalent joins and subqueries in the same amount of time. However, this is rarely the case. Since end users are as likely to write subqueries as they are to write joins, the optimizer should be tested to see how well it can handle both cases.

Aggregate functions

The LIKE command is used for pattern matching and can sometimes be optimzied by using index searches or scans of the leaf, or bottom, level of a Btree index. Similarly, aggregate functions such as COUNT, TOTAL or AVG can often be calculated directly from an index.

Testing updates is relatively straightforward in a single-user environment, but with the advent of local-area networks, things can get much more complicated.

In a multiuser environment, close scrutiny should be paid to the transaction manager, the type of logging and recovery options that are available, the number of users that can be handled concurrently, the granularity of locking and the degree to which the transaction manager provides consistency of data at the expense of concurrency.

A good transaction manager will allow a developer to choose the level of consistency that is desirable in order to achieve a certain level concurrency. To this end, the new SQL PC products, running in a requestor/server mode, provide a level of data integrity previously unattainable in LAN environments. Performance of any DBMS should take into account the overhead required to provide data integrity. A DBMS that does not ensure data integrity, even if it is very fast, is not very useful to an organization.

In these articles, we have attempted to point out some considerations when benchmarking DBMS systems. Ideally, all these issues should be transparent to the system developer and end user. As optimizers and transaction managers become more sophisticated, many of these issues will doubtlessly disappear. At the same time, we are confident that new issues will surface to take their place. In the meantime, the quality of the optimizer remains the single most important component of an SQL DBMS and should be well tested before any selection is made.

Pascal is an independent analyst based in Washington, D.C., and is affiliated with the Codd & Date Consulting Group, specializing in relational technology and SQL on microcomputers. Finkelstein is a senior consultant with Codd & Date.

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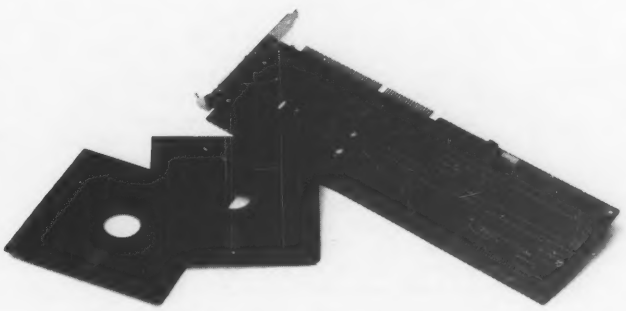

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NEW PRODUCTS

Development tools

Micromain Prototyper, software allowing users to design, revise and demonstrate mainframe applications on personal computers, has been announced by **Micromain Software, Inc.**

Micromain Prototyper consists of an integrated data dictionary, screen painting, report painting, scenario building, simulation and documentation subsystems

Micromain Prototyper costs $395.

Micromain Software, 5 Aldrin Road, Plymouth, Mass. 02360. 617-747-5933.

A table-driven assembler for microprocessors designed to work on Unix-based systems has been added by **Specialized System Consultants, Inc.**

Called **Framework Assembler**, the software allows programmers to program 8-bit microprocessors without a cross-compiler for each new chip. The product is a family of two pass-absolute assemblers that includes Intel Corp. Hex format output records.

In source form, the base program and the adaptation files for one target processor cost $175. Specialized System Consultants, P.O. Box 55549, Seattle, Wash. 98155. 206-367-8649.

Software enhancements

A networking version of the **Snow Report Writer** has been announced by **Snow Software.**

The multiuser version is said to allow shared data files to be merged to generate custom reports. Features include record locking, file protection, windowing and on-line Help, the vendor said.

The Snow Report Writer networking version runs on IBM Personal Computers on Novell, Inc., Orchid Technology, Inc., 3Com Corp. and IBM networks. It costs $995 for eight workstations.

Snow Software, 2360 Congress Ave., Clearwater, Fla. 34621. 813-784-8899.

An enhanced version of **Dbx**, the translator that allows users to transport Ashton-Tate Corp.'s Dbase programs into the C language and to other machines, has been announced by **Desktop AI.**

Dbx Version 3.0 features Dbx/Express, a programming language derived from Dbase and Nantucket Corp.'s Clipper; a system analysis program that automates the translation and compilation process; and an intelligent language translator for converting Dbase programs into C source code.

Translated programs can be directly moved to Unix, Xenix, Digital Equipment Corp. VAX and Apple Computer, Inc. Macintosh systems without Microsoft Corp. MS-DOS emulation.

Dbx costs $350.

Desktop AI, 1720 Post Road E., Westport, Conn. 06880. 203-255-3400.

Release 5.0 of the **Total Recovery Planning System** (TRPS) disaster recovery planning tool kit has been announced by **Chi/Cor Information Management, Inc.**

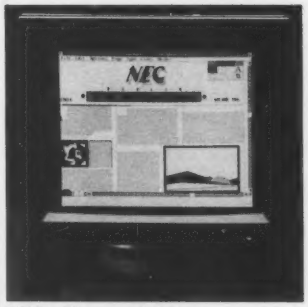
TRPS is said to provide the tools necessary for creating, managing and maintaining a disaster recovery plan. Release 5.0 includes a relational data base design, a section for documenting voice and data communications networks, a methodology for developing a recovery plan and a user-defined reporting facility.

TRPS costs $9,500 including the software, the methodology, some sample data and documentation. It runs on IBM Personal Computers and compatibles.

Chi/Cor, 10 S. Riverside Plaza, Chicago, Ill. 60606. 312-454-9670.

Printers/Plotters Peripherals

A full-page display system for desktop publishing has been announced by **NEC Home Electronics, Inc.**



NEC's *Monograph System*

Called the **Monograph System**, it features a 16-in. square screen; a 1,024-by 1,024-pixel monitor; a controller board; driver, font and diagnostics software; a signal cable; and a user's manual.

Other features include a built-in IBM Color Graphics Adapter (CGA) emulator that displays CGA software in double-scan mode with 640- by 400-pixel resolution. The video controller board fits in any IBM Personal Computer XT, PC AT or compatible in an 8- or 16-bit slot.

The Monograph System is priced at $1,999.

NEC also announced the **Multisync GS** monochrome monitor, which displays in up to 64 shades of gray. It costs $279.

NEC Home Electronics, 1255 Michael Drive, Wood Dale, Ill. 60191. 312-860-9500.

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DATA STREAM

Anthony J. Friscia

Pinpointing MAP's future

With the Enterprise Networking Event (ENE) approaching, the question arises: How are Manufacturing Automation Protocol's (MAP) prospects as a future factory LAN standard?

The past year has been generally quiet for MAP, which experienced sluggish sales and limited press. While this will not be a better year in terms of sales, the general MAP atmosphere is more positive than it has been for some time. There are three reasons for this more upbeat attitude.

First, the MAP/TOP Users Group has announced a six-year freeze on the MAP 3.0 specification. This will allow users to work with a stable product and will let vendors approach the market without fear of losing their return on investment.

Second, ENE is reinvigorating user interest in the standard. Although there will not be the same blind excitement that surrounded earlier events, ENE will undoubtedly open the door to MAP market opportunities.

Finally, the market has become more realistic with three years of experience under its belt. There will not be the same kind of overzealous forecasting and expectations that basically sealed MAP's fate in 1986.

ENE will be a major turning point — for better or worse — for the MAP market. A suc-

Continued on page 54

IBM exec speaks out on LAN Server's potential

Today, months after the waterfall of IBM OS/2 announcements, corporate users are still trying to figure out how to gracefully fit these products into their networking environments without serious disruption. *Computerworld* West Coast Bureau Chief Kathy Chin Leong interviewed Leland Reiswig Jr., director of IBM's Entry Services Division Austin Laboratory and head of the OS/2 Extended Edition project, to discuss the merits of IBM's new LAN Server.

Leland Reiswig Jr.

Why did IBM decide not to license the entire LAN Manager program from Microsoft Corp., instead developing the LAN Server on its own?

We wanted to optimize the local-area network support in our LAN Server product and in the Extended Edition, and we wanted to optimize it to support the standards we are setting for Extended Edition, which are [IBM Systems Application Architecture]-compliant to the Common User Access interface, or CUA.

We wanted to provide a different view of network and resource management than the LAN Manager provides. And we were looking to the future in terms of SAA support that could ensure that LAN Server would be complementary to our connectivity facilities and our host LAN support.

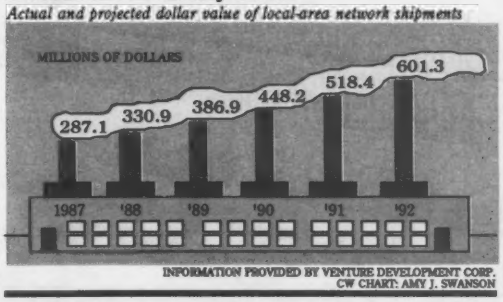
So the LAN Manager was going in a direction IBM was not heading?

Microsoft's requirements for LAN Manager do not necessarily prioritize the support and

Continued on page 58

Investment in factory LANs

Actual and projected dollar value of local-area network shipments



INFORMATION PROVIDED BY VENTURE DEVELOPMENT CORP.
CW CHART: AMY J. SWANSON

NET prods skeptics

Firm aims to prove it's not an IBM puppet

BY ELISABETH HORWITT
CW STAFF

REDWOOD CITY, Calif. — Nearly a year after signing a resale and technology transfer agreement with IBM, Network Equipment Technologies Corp. (NET) is still struggling to convince a skeptical industry that its product development plans are not dominated by its giant partner.

IBM "does have the rights to our proprietary protocols, so they can use them in IBM products, which they can announce apart from us," Kurt Jaggers, NET's marketing manager of network systems products, told *Computerworld* in a recent interview. NET will also continue to develop products of its own to add value in the IBM Systems Network Architecture (SNA) market, "where there is a huge overlap between our customers and IBM's," Jaggers said.

Nevertheless, recent product announcements and statements of direction from both vendors point to a strong bond in their respective telecommunications product strategies — particularly in the network management area.

For example, on Jan. 26, IBM announced that it is working on a Personal System/2-based network management workstation that would provide "real-time information and control for a [NET] Integrated Digital Network Exchange [IDNX] network in both graphic and text for-

Continued on page 51

Video rental king loads in automation

BY PATRICIA KEEFE
CW STAFF

SPRINGFIELD, Va. — Video rental king Erol's, Inc. is a classic all-American success story. So it's not surprising that savvy owner Erol Onaran, who immigrated here from Turkey 25 years ago with $16, also leads the video market in automation.

Onaran, who started out in television repair, took a chance in 1980 and jumped full force into the then-fledgling video rental market. Seven years later, Erol's is ranked No. 1 in *Video Store* magazine's annual top 100, with $154,676,000 in revenue from 147 stores.

Service and speed are the chain's hallmarks, and it relies heavily on a vast point-of-sale (POS) terminal network and bar-code readers to achieve those goals. Servicing more customers in a shorter time means more revenue, satisfied customers and repeat business.

While it might seem a cheaper route to some, Erol's nixed a local-area network in favor of POS terminals attached to in-store IBM System/36s. These are primarily Model 5362s, but Erol's is switching over to Model

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Inside

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- AT&T links SDN, Accunet. Page 50.
- Racore adds access unit for Token-Rings. Page 59.

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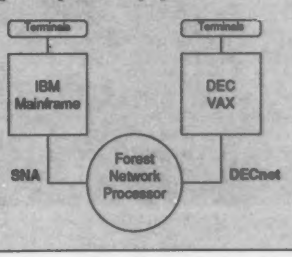

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Study shows EDI is on the fly

BY PATRICIA KEEFE
CW STAFF

The electronic data interchange (EDI) market appears to be growing at a fast clip despite somewhat lukewarm reports from users who either feel they were strong-armed into buying EDI or are unsure about its benefits.

Link Resources Corp., a research firm based in New York, estimates that there are about 3,600 active EDI user companies and predicts this figure will rise to 10,500 by the end of 1991.

While Input, a Mountain View, Calif.-based research firm, estimates EDI growth at a whopping 147% per year, Link takes a much more conservative approach. Link has adjusted its 1986 revenue for EDI from $30 million to $27 million but nonetheless projects steady upward growth — 45% to 60% annually — through 1991.

In a recent report, Link surveyed EDI users from 20 U.S. companies in the manufacturing, transportation and retail industries that had annual sales of at least $100 million.

Despite expectations of healthy EDI growth, Link's survey did not uncover wild enthusiasm for EDI among users. Although 75% of the respondents cited internal interest in EDI, a significant 40% said the impetus came from customers.

In a similar vein, 15% said they installed EDI only because they had to. Even so, 45% were very positive about EDI, and 35% said they believed EDI was where the industry was going.

Also, a recent report from the Automotive Industry Action Group based on interviews with 250 firms found that many had installed EDI only to accommodate major customers.

As for benefits, 35% of those surveyed by Link said they did not know or it was too early to tell; 15% said they expected to reap future savings; and 15% said it is strictly a customer service.

In the Link survey, users complained that the third-party provider segment of the EDI market is very fragmented. This makes one-stop shopping difficult, leading to little, if any, vendor loyalty.

Although 65% of the users said they are using publicly approved or industry-standard EDI formats, they must often support proprietary formats from trading partners. Therefore, industrywide cooperative efforts are essential, Link said.

The global view

Internationally, the picture appears much rosier, according to Input. A recent report estimates the 1987 market at between $75 million and $90 million for network/processing services, software and professional services.

Some domestic EDI vendors, such as GE Information Services and IBM's Information Network, are developing strategies for international capabilities for two basic business reasons: their largest clients will require international support, and such services will be necessary to qualify as full-service positions.

Input attributed rising interest in international EDI to increasing domestic recognition of the benefits associated with EDI: reduced inventory, improved customer service, faster turnaround and lower costs. Thus, U.S. user expenditures for international EDI network and processing services are expected to rise from $2.5 million this year to $220 million by 1992.

Despite Input's rosy expectations for growth in international EDI use, it does cite some impediments. A number of international trade participants are developing information systems incompatible with EDI's dominant trends, which could slow the adoption of international EDI.

Another troublesome issue is transborder data flow, which inhibits the transfer of business data. Also, some foreign carriers have placed restrictions on leased lines through pricing designed to encourage public network use, which Input says may not be the best solution in certain data applications.

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AT&T links SDN, Accunet service

AT&T recently announced a link between its Software Defined Network (SDN) and the Accunet Switched 56 Service. Combining the two services provides end-to-end, 56K bit/sec. data transmission for users who cannot justify dedicated links for applications such as bulk data transfer and graphics transmission, AT&T said. The "static" version of the combined service requires a dedicated data channel between user and AT&T premises; the dynamic version allows users to allocate the same 56K bit/sec. line for digital voice or data transmissions on a dynamic basis. AT&T hopes to offer the new capability as a tariff by mid-year.

Fibronics International, Inc. and **Control Data Corp.** have signed a joint development agreement to link CDC's Cyber line of computers with Fibronics' System Finex network, a 100M bit/sec. fiber-optic network that conforms to the Fiber Distributed Data Interface standard. The resulting network products will attach high-speed peripherals such as

Continued on page 55

NET

CONTINUED FROM PAGE 47

mats." The workstation will forward IDNX network events, as SNA alerts, to IBM's Netview network management system.

NET has since told *Computerworld* that it plans to upgrade Enhanced Operator Console (EOC), its existing IBM Personal Computer AT- and PS/2-based network management workstation, from IBM's PC-DOS to OS/2. NET also plans to provide on EOC the same level of functionality that is now available on its proprietary, Unix-based Integrated Network Command System, Jaggers said. And though "EOC is definitely not Netview," the system does send network alerts to Netview via the Netview/PC interface. NET also plans to support IBM's expected release of generic Netview commands, which will allow NET's IDNX line to be configured from a Netview host.

Independence stays

On the other hand, NET is remaining independent as to the data base management system it uses for centralized collection of network management statistics, Jaggers said. The T1 switch vendor will continue to use Oracle Corp.'s Oracle as its data base despite the fact that IBM recently announced it will base its own system on its DB2.

And NET is exploring on its own potential uses of expert systems and artificial intelligence technology in its products, according to Jaggers. One possibility is an expert system component to advise users on how to diagnose problems on IDNX networks. A second possibility is an AI-based graphics system that will present network topologies not only of NET switches but of other vendors' products as well. AI-based tools may also help NET connect its data bases with IBM's, Jaggers said.

When NET recently announced its intent to support 45M bit/sec. T3 links, IBM quickly followed with its own statement of direction to support T3. Although IBM indicated that its initial support will be through the NET product line, its introduction of the high-end 3745 communications processor, which can support up to eight active T1 links, indicates another focus for the vendor's thrust into high-speed interconnectivity. NET, for its part, plans to market its T3 capabilities as a way to link powerful host processors, local-area networks and video applications, Jaggers said.

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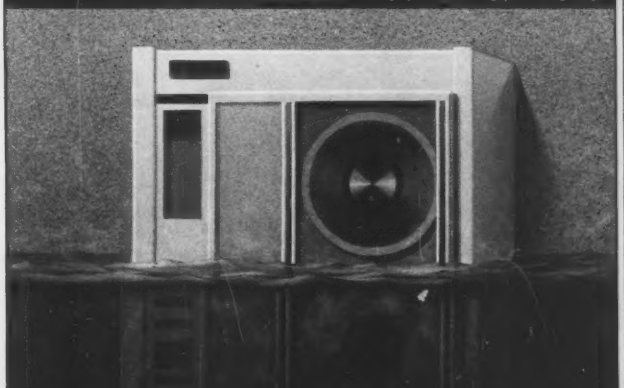

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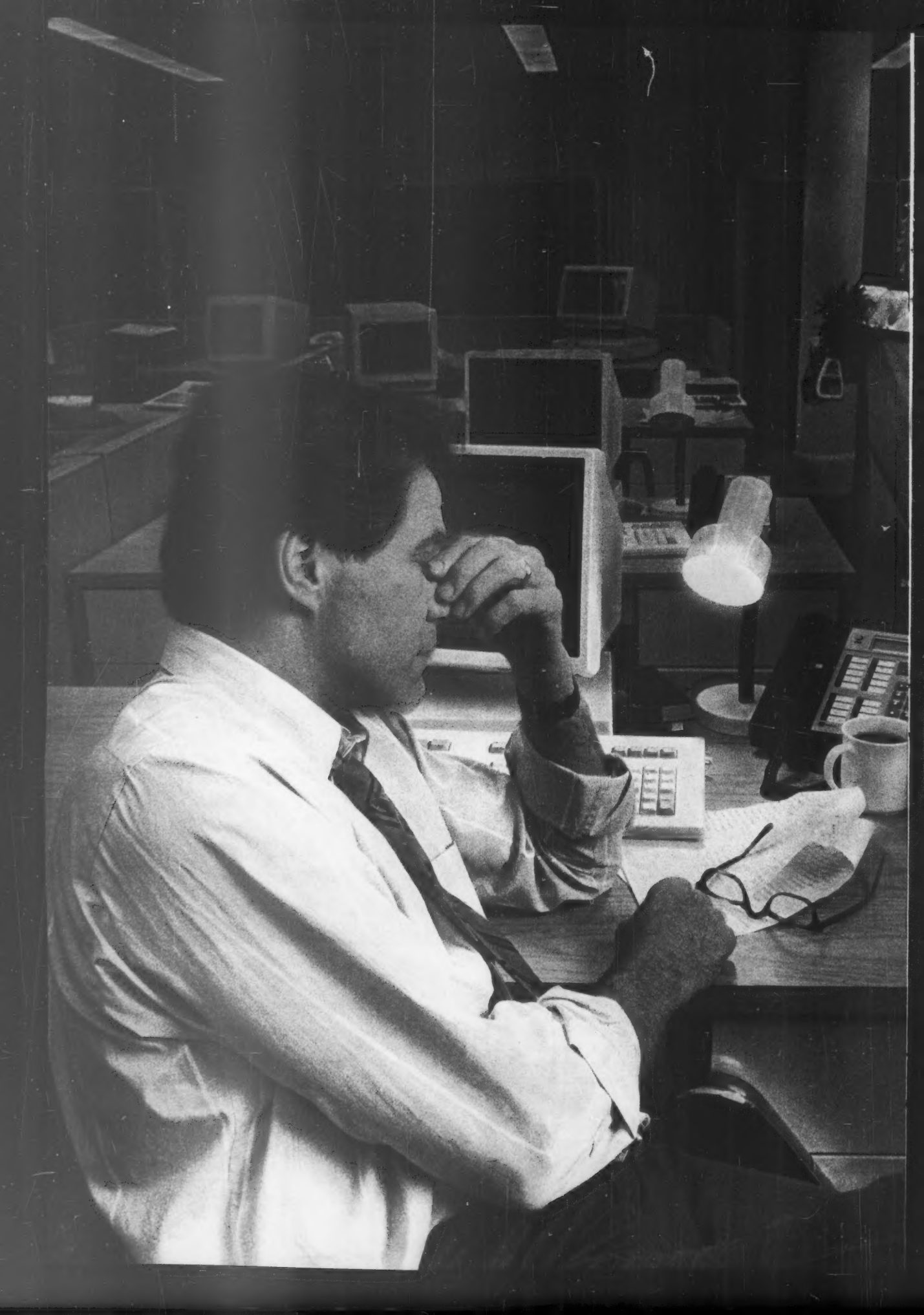

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Friscia

FROM PAGE 47

cessful event will restore user confidence, but if users hear once again that they must wait for solid MAP products, they may abandon the standard for good. A review of where the market has come from makes clear the current pitfalls to its potential.

Advanced Manufacturing Research (AMR) conducted a number of user surveys during 1987 to determine the status and potential for MAP sales. It was clear that two factors contributed to the slowdown.

Plans on hold

First, companies that expected to enter the pilot phase (limited in-plant installations) in 1987 put MAP implementation plans on hold. Second, expected "rapid followers" did not jump into the market due to the lack of early success stories. This absence of new users left virtually all MAP activity to essentially 30 pioneer user companies, putting limits on the immediate growth potential of the overall market.

Contrary to commonly reported opinion, the majority of users interviewed did not blame "waiting for MAP 3.0" as the reason for a slowdown in activity. Most of these users understood at the beginning that their MAP efforts would require a phased migration process. Users, in fact, said they planned to install hybrid versions of MAP that would require modifications over time.

Among users who slowed down or ceased MAP activity, 50% of the respondents said the primary reason was vendor performance and product quality and availability. The gripe here was that vendors were late delivering products, and once products were delivered, they were of beta-test quality at best, which significantly increased implementation time.

MAP 3.0 has thus only become a factor because product delays added so much time to users' implementation cycles that MAP 2.1 installations were finally scheduled for completion at the same time that MAP 3.0 products were to be available. It thus became perceived as foolish not to wait for the next generation of products. Had MAP 2.1 products been available when advertised, users would be more aggressively involved with MAP today.

As a result of the above factors, 1987 MAP connection sales stayed even with those of 1986 — approximately $17 million. Industrial Networking, Inc., a joint venture between General Electric and Ungermann-Bass, was last year folded into Ungermann-Bass and ended the year with approximately $12 million in sales, down from $16 million in 1986. Concord Communications did less than $4 million, slightly lower than its 1986 tally, in MAP product sales.

Sales this year should be flat overall — even with a successful ENE. A strong finish for the market this year will lead to solid fourth-quarter bookings but not to actual revenues realized. AMR thus forecasts 1988 sales at $20 million.

Sales aside, users still support MAP's development and say they would like to standardize on MAP/Open Systems Interconnect-based networks. In one survey, the vast majority of user respondents, 80%, stated that they want to support a communications standard within their factories.

Given the market's history, however, several factors are crucial to an upswing in the MAP market based on the success of ENE. First, the event has to be more than hoopla and must feature working 3.0 products. Second, vendors must be prepared to deliver working MAP 3.0 products to users following the event.

Users clearly will not tolerate any more delays. The option to use viable proprietary networks like DEC's Decnet is strong within many companies. If users are let down at the early 3.0 stage, the MAP product market will be in trouble.

Friscia is president of Advanced Manufacturing Research, a Salem, Mass.-based research and consulting firm.

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FROM PAGE 47

5363s and Model 5364s. Each store has six to 10 microcomputers, matching printers and one System/36.

Customers present a computer-coded club membership card along with their selections, whose labels are scanned and recorded by a bar-code reader. Printers at each sales counter immediately output an invoice. The whole process takes seconds, rather than minutes.

The day's transactions are sent into the store's System/36, which is also used to verify membership and track inventory. Nightly, these processors download data into an IBM System/38 in Springfield over leased lines using modems and IBM's LU6.2 technology. On-line 24 hours a day, the System/38 prints out nightly reports, controls a membership data base and updates inventory.

About a year and a half ago, Erol's decided to revamp its computer network to achieve greater efficiency and cost reductions. The previous setup used a mix of IBM 5251 and 5291 CRTs and Centronics Data Computer Corp. 150 printers, which required protocol converters, slowing down the system. Customer service was further hampered by having the terminals share one printer.

In April 1987, Erol's began implementing a new system. The older IBM CRTs are being replaced by homegrown PCs that feature one floppy drive, Ideacomm 5291 emulation boards from Ideassociates, Inc. and internal bar-code readers.

"We save 50% of the cost by building them ourselves," said A. J. Whitfield, manager of Erol's retail system. A number of emulation boards were tested, but Ideassociates' was the most compatible with Erol's system. The Ideacomm 5291 links the PCs to the System/36 and also supports the printers.

Upgrades

Today, each PC has its own 40-col printer, reducing invoice processing time by 50%. The added cost is outweighed by a net savings achieved by using cheaper printers and eliminating the 5291s and protocol converters.

Revamping the old system included a hard look at Erol's high-end processors. Whitfield admitted to some concerns about the future of the System/36 and 38. "We understand the operating systems are coming closer together [via Silverlake], but it has not arrived in time to do us any good," he said.

Erol's installed an IBM 3090 in December to handle the load from another 50 stores the company plans to open this year. "It's some evidence of our concern over where the System/38 is going," he conceded.

Continued from page 50

graphics workstations to Cyber host channels, the firms said.

Cylix Communications Corp. said recently it will provide an interface between its network management system and the IBM Netview network management system. Memphis-based Cylix provides data communications systems.

Sun Microsystems, Inc. has made more strides toward having its Network File System (NFS) accepted as an open industry standard. Some 150 vendors already support the protocol, and a Sun spokesman said recently that AT&T's 20% investment in Sun means that all future versions of AT&T's Unix System V will be shipped with NFS.

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Diagram Master™—Decision Resources, Inc.
Ego™—Zenographics, Inc.
EnerGraphics™—Enertronics
FlexDraw™—TNET, Inc.
Freelance™—Lotus Development Corporation
Graphwriter™—Lotus Development Corporation
Graphic Decision Support System™—Data Business Vision, Inc.
Hot Shots™—New Vision Technologies, Inc.
Image Management System™—Electronic Cottage
Impressionist™—ExecuComp
Mirage™—Zenographics, Inc.
orgCHART™—TNET, Inc.
PC Presents!™—Imedia Corporation
PC Slide Showmaker™—Management Graphics, Inc.
Pictureit™—General Parametrics Corporation
PicturePak Eye Openers™—Marketing Graphics, Inc.
PicturePak Technology™—Marketing Graphics, Inc.
PicturePak Business World™—Marketing Graphics, Inc.
PicturePak Maps™—Marketing Graphics, Inc.
SignMaster™—Decision Resources, Inc.
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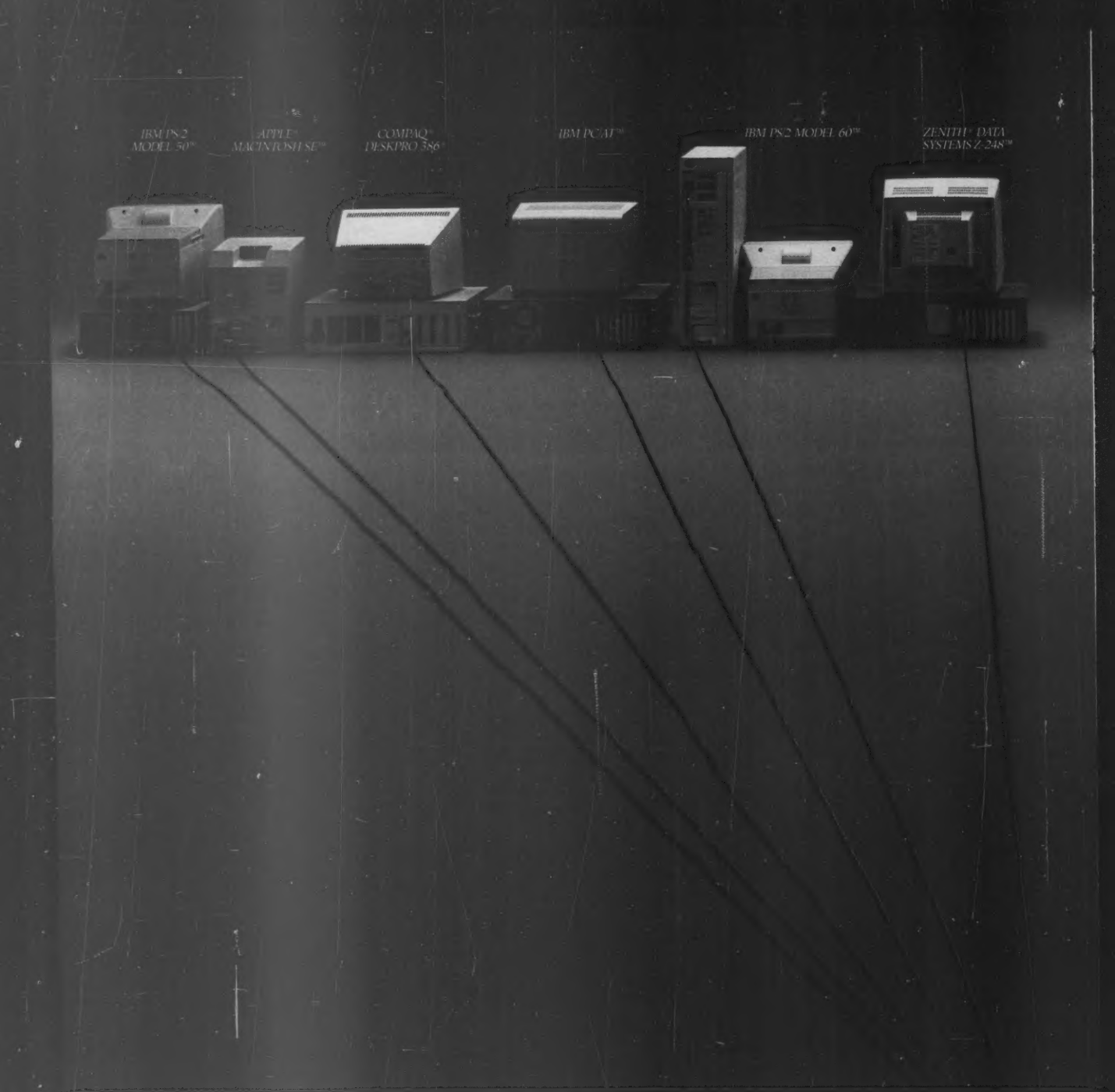

Presenting a mainf

It was five short years ago that DCA first introduced you to IRMA.™

Since then, over half a million IBM® PC,™ XT,™ AT™ and compatible users have made our IRMA family the industry standard in 3270 micro-to-mainframe communications.

But now, IRMA 2 provides connectivity between mainframes, PCs and the new IBM Personal System/2™ models. While MacIRMA™ connects mainframes with Macintosh IIs and SEs. All with the same 3270 emulation features your users have been familiar with for, well, five years now.

And what's good news for you is all of our

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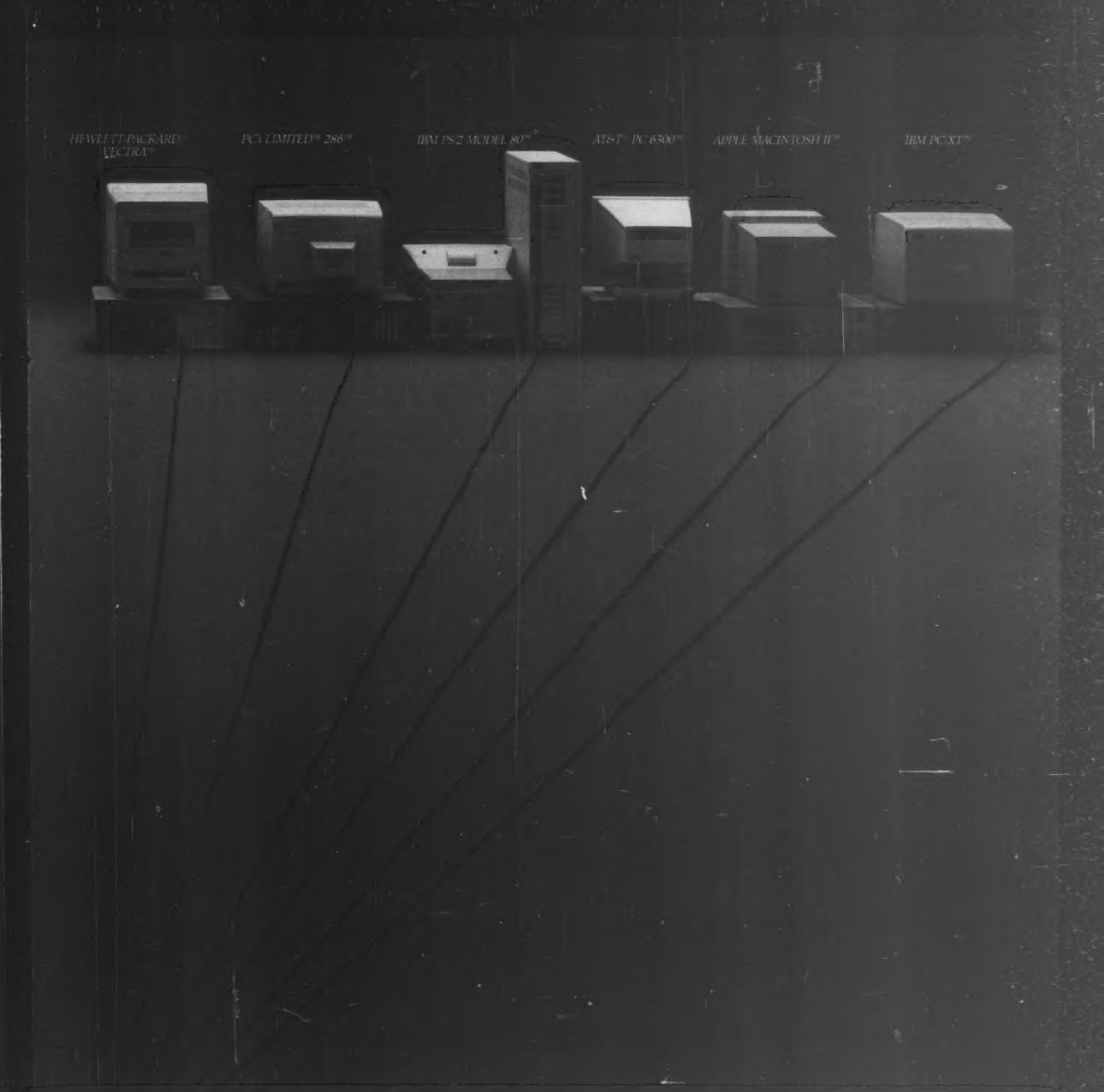

rame's view of DCA.

products can support the DCA and IBM mainframe file transfer software you probably already have installed in TSO, CMS and CICS environments.

What's more, DCA has products for every connectivity option. Including coax, SDLC, LAN gateways, LAN workstation software, twinax and asynchronous communications.

So, at a time when you're under the gun to preserve your company's investments in hardware, software, training and support, we can provide some help. It's called consistency.

For a closer look, call DCA at 1-800-241-IRMA, ext. 504.

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LAN Server

CONTINUED FROM PAGE 55

consistency with IBM's architecture. They [Microsoft] tend to look at LAN systems in terms of supporting all vendors' products, which is a priority for them. I think we have more of a host systems affinity.

The LAN Server announcement we made conforms to CUA standards and to how the Extended Edition will implement the SAA protocols for communications, user interface and data management.

What exactly is CUA?
That is the standard by which we are going to implement all of our user interface components into the Extended Edition and IBM's applications on OS/2. It is a standard for how we use color, how we use select items on a menu, terminology, function keys. It provides consistency to applications that are independently developed. From a user's perspective, as you switch from one to another, you don't have to relearn how to use the functions of an application. The standard has been published — the specifications for how we will write our applications and how our services will be implemented in Presentation Manager OS/2.

Will LAN Server support Microsoft MS-DOS machines?
Let me be specific. It will support PC-DOS, not MS-DOS.

Will OS/2 applications run on LAN Manager and LAN Server?
Some will. Those that conform to the OS/2 Application Program Interface will run transparently. Those that use the unique programming interfaces provided by LAN Manager will not run with the OS/2 LAN Server.

Since LAN Server requires OS/2 Extended Edition 1.1, what real gains will users obtain compared with what they are using today?
They will see the value of OS/2. They will be able to break the 640K memory barrier, run multiple applications and quickly switch between them. They will have concurrent processing going on in the background. In addition, because of those characteristics of OS/2 and Extended Edition, they can now have shared gateways and servers. They can get more effective utilization from existing hardware. The LAN Server program has functional enhancements beyond that of the PC LAN program, such as enhanced security, data base management and network management.

How will users tap the resources of systems outside the network?
There are no facilities that are directly a function of the LAN Server. But by using the LAN Server resource management in conjunction with our existing products that provide access to host data, this can be done more readily in an OS/2 environment than in a PC-DOS environment. Users won't manually have to go through separate operations to bring data down, store it and then put it within the context of a program. It will be much simpler.

Are all the pieces of LAN Server completed yet?
The testing is not yet completed. Most of the code is written. As far as what the product is, more details on it will come out as we get closer to shipping.

Will the LAN Server, priced at $995, require users to buy the IBM PC LAN Program Version 1.3?
No. It will support LAN Program 1.2. But when you use 1.2, you will not get access to all the functions provided by 1.3, such as network and resource administration, the user interface shell and security functions.

Do you need to have an OS/2 version of Netview in order to have Netview work in this environment?
No. You don't have to because Netview is monitoring traffic running on the LAN. Whether it runs on OS/2 or PC-DOS is not a significant distinction. OS/2 Netview is planned for future releases. It will do fine with PC-DOS.

Is there anything else we should know about Extended Edition or LAN Server?
It is important to focus on the fact that the Requester function of the Extended Edition is integral. That has a significant difference for users because of how easy it will be to access these functions . . . instead of having to deal with separate products. I am hopeful that Extended and LAN Server will be a much more cohesive user tool than all of the different products that users have to deal with now.

> WITH LAN Server, users "will be able to break the 640K memory barrier, run multiple applications and quickly switch between them."
>
> LELAND REISWIG JR.
> IBM

Inside thes
a revolution

NBI, Inc. Model 908

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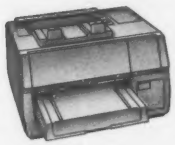
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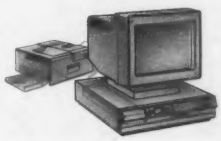
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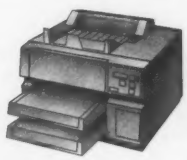
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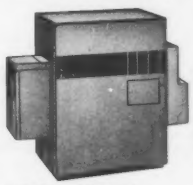
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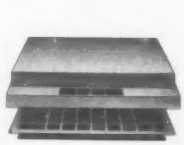
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NEC Information Systems
SilentWriter™ LC-890

QMS-PS® 2400

Apollo Computer Inc.
Domain/Laser 26™

NEW PRODUCTS

Local-area network hardware

Racore Computer Products, Inc. has introduced an eight-port **Multistation Access Unit** for use with IBM Token-Ring networks.

The access unit serves as the central junction box to connect all of the personal computers on the network. Each device can accommodate up to eight PCs and can be daisy-chained to configure a network with up to 260 workstations. According to the vendor, workstations can be connected up to 100 meters from the access unit. Daisy-chained units can be located up to 45 meters from one another.

The Racore Multistation Access Unit costs $395.

Racore, 170 Knowles Drive, Los Gatos, Calif. 95030. 408-374-8290.

A serial communications expansion card said to provide simultaneous support for multiple wide-area networking protocols has been announced by **Banyan Systems, Inc.**

The **Intelligent Communications Adapter** supports asynchronous, block asynchronous, IBM Synchronous Data Link Control and CCITT X.25 protocols. It is controlled by an Intel Corp. 80286 processor with 512K bytes of dedicated memory.

Included are two direct-memory access channel-controlled lines that transmit and receive data at rates of up to 64K bit/sec. and four interrupt-driven lines that operate at 19.2K bit/sec.

The 16-bit IBM Personal Computer AT bus card is compatible with servers running Banyan's Vines/286 or Vines/386 virtual network operating system software. It costs $1,495.

Banyan Systems, 115 Flanders Road, Westboro, Mass. 01581. 617-898-1000.

SDLC LAN Gateways for the IBM Personal System/2 Micro Channel bus have been introduced by **ICOT Network Systems, Inc.**

The IBM 3270 interfaces connect networked PS/2s and Personal Computers through a PS/2 Model 50, 60 or 80 to the IBM Systems Network Architecture host environment.

Each gateway supports up to 32 LU sessions on an IBM Netbios-compliant LAN. Up to 10 gateways of each type may be installed on a single LAN, the vendor said.

The SDLC LAN Gateway appears to the host as a 3274-51C cluster controller. Line speeds up to 19.2K bit/sec. over leased, switched or multidrop lines are supported. The X.25 LAN Gateway adheres to CCITT 1976, 1980 and 1984 recommendations.

Pricing ranges from $1,995 to $3,995.

ICOT, P.O. Box 91395, Mobile, Ala. 36691. 205-633-3270.

A Motorola, Inc. VMEbus-compatible local-area network interface board, the **V-Arc02**, has been announced by **Comendec Ltd.**

The product provides connection to Arcnet LANs. It is constructed around a very large-scale integration controller and functions as an intelligent slave in the system.

Interrupt level, interrupt vector, base address and addressing range are jumper-selectable. The board base address is selectable to a 4K-byte boundary, according to the vendor.

Other features include 2K bytes of dual-ported random-access memory, which provides four 512K-byte packet buffers.

The V-Arc02 connects to the Arcnet network cable via a coaxial lead to a connector.

The V-Arc02 LAN interface board costs $1,590.

Comendec, P.O. Box. 280, 708 Mandrake Drive, Batavia, Ill. 60510. 312-879-7003.

Tops, a Sun Microsystems, Inc. company, has announced a hardware device that attaches desktop computers and peripherals to Apple Computer, Inc. Appletalk networks using Tops' Flashtalk.

Called **Tops Teleconnector**, the product is compatible with Appletalk networks. Flashtalk simultaneously supports personal computer-to-Macintosh communications at the standard Appletalk rate of 236K bit/sec.

Network cables attach to the Tops Teleconnector via a standard RJ11 modular phone plug.

Tops Teleconnectors cost $59, including one cable and one RJ11 jack.

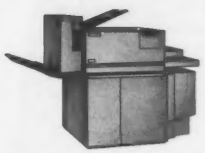
Tops, Suite 220, 2560 Ninth St., Berkeley, Calif. 94710. 415-549-5900.

Micom-Interlan has announced a protocol processor embedded with Transmission Control Protocol/Internet Protocol (TCP/IP) software for AT&T Unix System V, Release 3-based, Motorola, Inc. VMEbus-compatible systems.

Called the **NP722**, the card provides a set of hardware and software tools for TCP/IP processing. It consists of an Intel Corp. 80186 processor, 82586 local-area network coprocessor and 512K bytes of random-access memory. It processes direct memory addressing data and command transfers between the host's main memory and the network, the vendor said.

Micom, 155 Swanson Road, Boxboro, Mass. 01719. 617-263-9929.

se printers
is going on.



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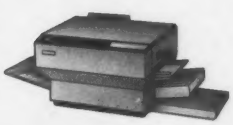

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Apple Computer Inc. LaserWriter®
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PostScript® from Adobe Systems started a revolution in business communications. That's why you'll find PostScript in virtually every popular laser printer sold today.

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company's needs. Since PostScript is device independent, you can design a document, then professionally print it later at a higher resolution.

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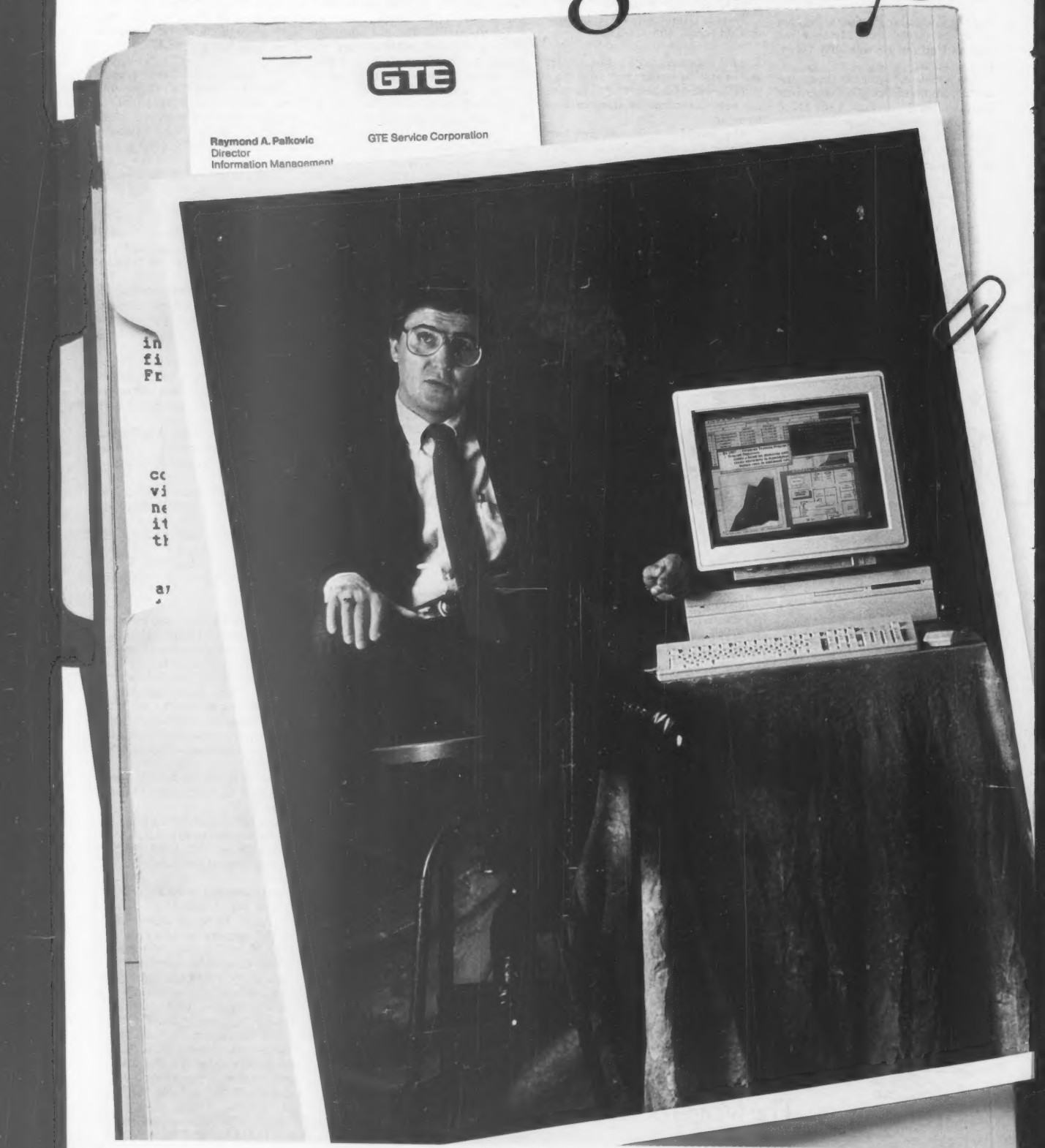

Macintosh, keeps job.

Until very recently, the above headline was the MIS equivalent of "Man Bites Dog."

Because specifying Macintosh® personal computers for the corporate desktop was an act of sheer daring. Like hang gliding, or wearing a Mohawk.

But now, if the behavior of data processing executives is any indication, we've engineered the thrills out of handing us a purchase order.

Since the introduction of the Macintosh Plus with its 1 to 4 megabytes, and most recently the faster, expandable and MS-DOS compatible SE, hundreds of the *Fortune 500* have put Macintosh to work.

At first we were hired for specific jobs that no one else can do as well. Like low cost CAD/CAM and Desktop Publishing.

But then, our other merits revealed themselves.

Such as the open architecture of the SE and the new Macintosh II.

Which lets you connect seamlessly to DEC's VAX, IBM mainframes, and other popular systems. And by putting Macintosh at the front end, you give people a more civilized way to deal with mainframes.

Another revelation is the wide array of innovative Macintosh business applications–financial analysis, word processing, databases, and, of course, graphics. Which are not only easier to learn than what's running elsewhere, but more advanced.

The point-and-click simplicity of the Macintosh graphic interface is a well known boon for the user.

But it also turns out to be a major time and money saver for you who have to train all those users. Because Macintosh has a lower training cost per desktop than any MS-DOS computer on the market.

Macintosh's simple, straightforward operating style also pays off impressively after the training is over.

In an in-depth analysis of 7 Macintosh installations in business, users consistently reported productivity gains of 15 to 25% and more.

And on top of all this, Macintosh has excellent connections.

While others are pushing the "network of the Near Future," the Macintosh network is here and now. It's called AppleTalk®.

AppleTalk is a networking protocol that is at the same time sophisticated, infinitely flexible, easy to set up. And meets ISO standards.

You can link the system together just about any way you want to–over phone lines, twisted pair, fiber optics or Ethernet.

Plug in a card and you can run AT&T UNIX® as well as MS-DOS applications. And in fact, there are a variety of other ways to integrate Macintosh into the MS-DOS world.

Including the AppleShare™ file server which lets Macintosh and PC's link and share data.

All of which makes it a simple matter to incorporate Macintosh into any existing network.

Or, to build new ones.

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You'll find out how so many DP professionals can buy Macintosh.

And still keep their names out of the papers.

The power to be your best.™

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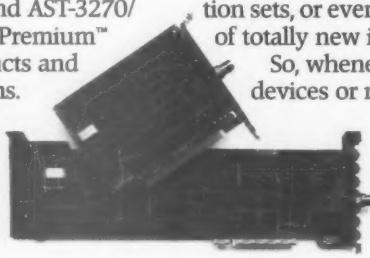
We've Decided To Call Off The Competition Between IBM® and IRMA®.

It no longer matters which 3270 emulation will become the reigning standard.

Because now you can have compatibility with both IBM and IRMA using AST's two new micro-to-mainframe communications solutions: AST-3270/CoaxIIA™ for IBM Personal System/2™ Models 50, 60 and 80; and AST-3270/CoaxII™ for AST Premium™ Computer products and PC-based systems.



Which means you can run all existing application software designed to run on either IBM or IRMA hardware today. Or take advantage of our new family of high-function, 3270 emulation software for CUT, DFT and graphics modes.

Whichever software you choose, your organization's investment will be protected from obsolescence caused by the introduction of new 3270 devices or protocols.

Because built into the AST-3270/CoaxII family are custom processors enabling future modification of existing soft-loadable instruction sets, or even the development of totally new instruction sets.

So, whenever new terminal devices or new protocols come on the market, AST will offer diskette-based microcode upgrades.

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Local-area network software

An eight-user version of the **Tapestry** network system has been announced by **Torus Systems Ltd.**

According to the vendor, Tapestry/8 offers all the functionality of regular Tapestry, including electronic mail, file sharing, printer sharing, network management and asynchronous communications. It operates with Torus's local-area network hardware, the Torus Ethernet Plus adapter or any IBM Netbios-compatible LAN hardware.

Because it uses distributed architecture, Tapestry/8 allows any or all of the personal computers to be undedicated servers. However, network configuration is centralized.

Tapestry/8 costs $795.

Torus, 240 B Twin Dolphin Drive, Redwood City, Calif. 94065. 415-594-9336.

Network management

A dial backup system designed to protect data networks from leased-line failures has been announced by **Control Resources Corp.**

Called the **Intelligent Dial Backup System**, the modular system features microprocessor-controlled common logic and an internal electronic cross-connect that automatically switches the local end of a failed leased line to any available dial facility.

Other features include bridging for backing up multipoint circuits and centralized control of multiple local or remote systems with an IBM Personal Computer.

Prices start at $11,900 for a minimum configuration of 12 local leased lines and four four-wire dial line pairs. Maximum configuration is 192 leased lines and 48 line pairs.

Control Resources, E64 Midland Ave., Paramus, N.J. 07652. 201-265-2700.

A network management system that runs on an IBM Personal System/2 with a Video Graphics Array color monitor has been introduced by **Newbridge Networks, Inc.**

4601 Mainstreet includes software that centralizes all alarm reports from Newbridge's networking products. The 4601 Mainstreet workstation extends single-site control from the digital T1 backbone network down to the individual data ports on the end user's desk top.

4601 Mainstreet connects to the private T1 network through a cable between a serial port on the PC and a port on a network node. Each node responds only to the commands addressed to it specifically.

4601 Mainstreet costs $3,895.

Newbridge Networks, 13873 Park Center, Herndon, Va. 22071. 703-834-3600.

Customer-premise equipment

A voice processing system for IBM Personal Computers has been announced by **American Telesystems Corp.**

Voicemate is said to provide integrated voice and data processing. The system consists of a voice processor on a plug-in board, the operating system, application software and documentation. The system provides voice-mail capabilities for up to 50 users and can be expanded for up to 2,000 users. Users can access the system through a Touch-Tone telephone.

Features include name addressing; user/controller password; guest access; annotate and redirect; prompting; distribution lists; and Help.

A 25-user system costs $3,995; a 50-user system costs $5,995.

American Telesystems, 7 Piedmont Center, Atlanta, Ga. 30305. 404-266-2500.

A system said to convert a desktop personal computer into an answering machine, an electronic bulletin board or a message clearing house has been announced by **NCR Corp.**

The **NCR Voice Management System** combines voice-mail capabilities with a speech processor, a personal calendar, a modem and communications management software.

The voice management system provides computerized dialing, answering and message delivery, data communications and a phone number data base for single or multiple users.

The system can be operated from a desk or remotely by a Touch-Tone phone, according to NCR.

The NCR Voice Management System operates on the vendor's PC710 and PC810 workstation family. It is priced at $695.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 513-445-5000.

A line of manual peripheral-sharing switches with built-in surge protection devices has been announced by **Bravo Communications, Inc.**

The **Sure/Fire** line of bidirectional switches allows configuration of two to four peripherals to be connected to one CPU or two to four CPUs to be connected to one peripheral device. The switches are available in both serial and parallel versions. According to the vendor, they protect against all forms of in-line cable power surges and spikes.

The bidirectional switches are priced at $189 each.

Bravo Communications, 4460 Partridge Court, San Jose, Calif. 95121. 408-270-4500.

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Even small, inexpensive computers can accommodate a variety of high volume data entry with VDE: the Viking Data Entry software that improves accuracy, cuts costs and requires little training. Special Viking features like data editing, data validation and key verification insure that entries are correct the first time. For more information about savings with VDE, call . . .

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On January 26, 1987
IBM announced the IBM 3090 Model 600E.

It uses the fastest one-million-bit memory chips in a commercially available computer and it computes up to fourteen times faster than the earlier IBM 3084.

And it's the largest general-purpose computing system installed anywhere in the world.

IBM

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On February 25, 1987
IBM announced that an experimental 4-million-bit chip had been fabricated on the same manufacturing line responsible for the world's first mass-produced one-million-bit chip.

Which makes it another great memory of the future.

IBM

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Links

Bridge Communications, a division of 3Com Corp., has announced internetwork bridges and IBM Personal Computer network servers offering such security features as network access control by port, use of the Data Encryption Standard and audit-trail information.

The **Secure Personal Communications Server/1** family provides secure network connections for IBM PCs and Personal System/2 Model 30s using Transmission Control Protocol/Internet Protocol. The IEEE 802.3 Ethernet and the Bridge Broadband Ethernet servers cost $1,795 each.

The **Secure IB** bridge products cost from $12,000 each. The Secure IB/1 links 802.3 Ethernet local-area networks with 5M bit/sec. Bridge broadband LANs. The **Secure IB/2** interconnects two Ethernets via transceiver cables or fiber-optic media.

Bridge Communications, 1345 Shorebird Way, Mountain View, Calif. 94043. 415-969-4400.

An upgraded version of **Intalk**, desktop telecommunications software for the Apple Computer, Inc. Macintosh, has been released by **Palantir**.

Version 3.0 adds a user interface that allows the windows to be resized and relocated; use of the text editor or the communications command language editor script language and the terminal at the same time; faster screen drawing; on-screen function keys; Connect protocol for Control Data Corp. mainframes; and a feature that allows the user to paste graphics and data to the clipboard of a remote Macintosh running Intalk.

Other features of Intalk include text file transfer with handshaking and filter options and terminal emulations.

Intalk 3.0 costs $195. Registered users can upgrade for $50.

Palantir, Suite 100, 12777 Jones Road, Houston, Texas 77070. 713-955-8880.

Control Data Business Centers has announced a software program said to link microcomputers to Orchestrator, its mainframe payroll, human resources and accounting services.

Called **Orchestrator Premier**, the software is a data entry and communications program that includes reporting, linking and file-translation modules. It accesses data files downloaded by the vendor's applications made available through Control Data Business Centers' data service network.

The report writer features the ability to sort, select, total and calculate. Other features include password and functional security and special edit routines.

Orchestrator Premier runs on IBM Personal Computer XTs, ATs and Personal System/2s. It costs $3,000.

Control Data Business Centers, 8100 34th Ave. S., Minneapolis, Minn. 55440. 612-853-8100.

Protocol converters

Black Box Corp. has announced the **Black Box Multiport Protocol Converter**, which is said to support up to seven parallel and serial devices simultaneously.

The base unit comes with four RS-232 serial ports that can be configured for data rates from 110 to 19.2K bit/sec., for one or two stop bits and seven or eight data bits with odd or even parity.

According to the vendor, the protocol converter allows most ASCII printers to emulate IBM 5256 printers. It also lets ASCII terminals or personal computers with terminal-emulation software emulate IBM 5291 and 5251 printers.

The base unit costs $2,749. Additional ports can be added for $335 each.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241. 412-746-5530.

A 32-port protocol converter has been announced by **Local Data, Inc.**

The **Datalynx/3174** is said to emulate an IBM 3174 Systems Network Architecture controller. It supports up to 32 ASCII terminals.

Software that provides asynchronous pass-through capabilities is available. Asynchronous terminal users can access IBM mainframes through protocol conversion or ASCII minicomputers through a straight ASCII pass-through mode. Computer-to-computer applications are also supported.

The Datalynx/3174 protocol converter is available in four- to 32-port models. It is priced from $3,000 to $10,500.

Local Data, 2771 Plaza Del Amo, Torrance, Calif. 90503. 213-320-7126.

A multiprotocol communications adapter board for IBM Personal Computers, PC XTs, ATs and compatibles attached via coaxial cable to an IBM 3274 or 3174 cluster controller has been announced by **Network Software Associates, Inc.**

Called **Adaptcoax**, the board supports PC-to-host communications through a 3274 or 3174 using any one of three IBM Systems Network Architecture protocols: 3270, LU6.2 Advanced Program-to-Program Communications or 3770 RJE, the vendor said.

Adaptcoax plugs into a single expansion slot. The associated software runs under IBM's PC-DOS 2.0 or higher.

The Adaptcoax board costs $595.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653. 714-768-4013.

On April 2, 1987
The IBM Personal System/2®
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IBM made no new product announcement.

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File servers

An upgraded version of the **386Ware** Microsoft Corp. MS-DOS server has been announced by **Logicraft, Inc.**

386Ware is said to enable up to eight concurrent users on a Digital Equipment Corp. VAX system to access personal computer software. The upgraded version includes a 1.2M-byte floppy disk drive, load balancing between servers and enhanced resolution for Lotus Development Corp.'s 1-2-3 enhanced graphics adapter drivers. In addition, the vendor said, communication speed between 386Ware and the VAX host has been doubled.

386Ware for four concurrent users costs $10,995; for eight concurrent users, it costs $15,995. A diagnostic package that provides the ability to analyze 386Ware performance costs $795.

Logicraft, 22 Cotton Road, Nashua, N.H. 03063. 603-880-0300.

Software that creates an optical disk-based file server for local-area networks has been announced by **Optical Storage Solutions, Inc.**

Called **OS-DOS 4.0**, the Microsoft Corp. MS-DOS-compatible software was designed to connect IBM Personal Computer systems with any of 11 different 5¼-, 8- or 12-in. optical drives. The connection allows the optical disk to operate as if it were a Winchester disk. Users can address the drives transparently as part of a Novell, Inc. network, the vendor said.

The software supports a 20-char. file name, 65,000 subdirectories and an unlimited number of files, the vendor said. File size may run up to 2G bytes.

OS-DOS 4.0 is priced from $1,250.

Optical Storage Solutions, 1130 D Burnett Ave., Concord, Calif. 94520. 415-825-3441.

Electronic mail

Tel-E-Mail, a Lotus Development Corp. 1-2-3 add-in said to provide unattended

Tel-E-Mail *imports on-line data into Lotus's 1-2-3*

background communication, text editing and electronic mail capabilities, has been announced by **3X USA.**

According to the vendor, Tel-E-Mail can automatically capture and reformat or edit data from on-line information services and other remote computers without leaving 1-2-3. Users can also use Tel-E-Mail's built-in editor to create messages or modify text files without leaving 1-2-3.

Tel-E-Mail supports general-purpose data communication in stand-alone or memory-resident mode. It requires a Hayes Microcomputer Products, Inc.-compatible modem and 1-2-3 Release 2.0 or higher. Each $99 package includes two copies of Tel-E-Mail.

3X USA, 393 Park Ave., Leonia, N.J. 07605. 201-592-6874.

An enhanced version of the **PC-Tpost Electronic Mailbox** for IBM Personal Computers and Personal System/2s has been announced by **Coker Electronics.**

Version 3.0 of the software is said to feature an electronic mail bulletin board with remote mail deposit and collection capabilities; batch mail sending and receiving; electronic mail for portable PCs; a local-area network E-mail bridge; and direct mail deposit.

The PC-Tpost Electronic Mailbox is priced at $129.

Coker Electronics, 1430 Lexington Ave., San Mateo, Calif. 94402. 415-573-5515.

An enhanced version of **Chairman**, a multiuser bulletin board software package for IBM Personal Computer XTs, PC ATs and compatibles, has been announced by **Dynamic Microprocessor Associates, Inc.**

The new release is said to support data transfer rates of up to 19.2K bit/sec. and adds support for many protocols. According to the vendor, Chairman allows use of the full IBM graphic character set.

A full Chairman multiuser system costs $995. A two-line version costs $495; a single-user version costs $295.

Dynamic Microprocessor Associates, 545 Fifth Ave., New York, N.Y. 10017. 212-687-7115.

Security

The **Onguard PC System 2400**, an uninterruptible power system said to provide 12 to 24 minutes of on-line backup for multiple local-area nework file servers, has been announced by **Clary Corp.**

The Onguard PC System 2400 provides 2,800W of peak repetitive power for primary loads as well as 480VA of isolated, conditioned power for secondary loads, such as printers, modems and remote terminals. Two sets of AC power receptacles are provided for a total of five loads.

Features include true sine wave output, sealed batteries, pulse width modulation technology and a status display panel.

The Onguard PC System 2400 costs $1,490.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776. 818-287-6111.

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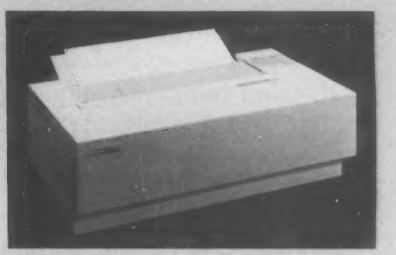

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Colorado: 303/799-8525
Arizona: 602/431-0016
Utah: 801/485-4900
California: 818/718-0073, 714/220-6487, 619/268-4730, 408/947-3588

Modems/Multiplexers

Codex Corp. has introduced the **Codex 6228** digital transmission multiplexer, designed to operate at aggregate rates from 48K to 256K bit/sec.

According to the vendor, the Codex 6228 can support up to 56 channels in a single enclosure. It uses plug-in modules to provide loop-backs, alarms and planned integration with Codex network management systems. The multiplexer can also support multiple link control, modem tail circuits and drop-and-insert applications, the vendor said.

The Codex 6228 is priced at $4,975.

Codex also introduced the Codex 2362 point-to-point leased-line data modem. It is compliant with CCITT V.33 and V.29 standards, operates at speeds from 4.8K to 14.4K bit/sec. and costs $3,195.

Codex, Maresfield Farm, 7 Blue Hill River Road, Canton, Mass. 02021. 617-364-2000.

An RS-232 multiplexer has been announced by **Western Telematic, Inc.**

The **DM-41** features four asynchronous channels that simultaneously communicate at speeds to 9.6K bit/sec. It is said to be capable of transmitting up to 5,000 ft over twisted-pair telephone wire. The multiplexer is 1 in. thick and was designed to mount on walls or behind workstations.

The DM-41 multiplexer costs $295.

Western Telematic, 5 Sterling, Irvine, Calif. 92718. 714-586-9950.

A data communications exchange unit designed to allow peripheral sharing, computer-to-computer communication and buffering of print data has been announced by **Bay Technical Associates, Inc.**

The device, called the **Data Communications Exchange System24**, features a 16-bit CPU. It is customized by combinations of serial and parallel ports installed in four-port I/O modules to a maximum of 24 ports. The standard 512K-byte buffer is expandable to 4.5M bytes. It operates in full-duplex mode.

The device costs from $895 to $1,895.

Bay Technical Associates, 200 N. Second St., Bay St. Louis, Mo. 39520. 601-467-8231.

A device said to link asynchronous data terminals to host computers up to 10,000 cable feet away has been introduced by **Teltone Corp.**

The **T-Line-3** transmits full-duplex data at 19.2K bit/sec. on spare telephone wire pairs, the vendor said.

The T-Line-3 units cost about $275 per channel.

Teltone, 10801-120th Ave. N.E., Kirkland, Wash. 98033. 206-827-9626.

A facsimile modem card that allows IBM Personal Computers and compatibles to communicate with Group 2 and 3 facsimile machines has been announced by **Ricoh Corp.**

The **Imagecard** is said to allow facsimiles to be sent or received as a background task so the PC can be used for other applications. Incoming messages are automatically saved to disk.

Other features include automatic dialing, automatic error checking and generation of reports for traffic control and management. Software to drive the Imagecard is included with the board.

The Imagecard costs $1,175.

Ricoh, 5 Dedrick Place, West Caldwell, N.J. 07006. 201-882-2000.

A modem simulator for short-distance local applications has been announced by **Teleprocessing Products, Inc.**

The **TP-235** features a V.35 interface and can support data rates up to 1.54M bit/sec. with its optional T1 feature, the vendor said. It can be used either in continuous or controlled carrier systems.

Other features include front panel indicators and a digital data loop-back capability.

The TP-235 modem simulator with T1 option costs $595.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063. 805-522-8147.

A V.32 9.6K bit/sec. modem has been announced by **Cermetek Microelectronics, Inc.**

The 9600FR is capable of operating at 9.6K and 4.8K bit/sec. using V.32 technology, as well as 2,400, 1,200 and 300 bit/sec. using V.22 bis, Bell 212A and 103. It also includes options for X.25 and Microcom Networking Protocol.

The 9600FR costs $1,995.

Cermetek Microelectronics, 1308 Borregas Ave., Sunnyvale, Calif. 95088. 408-752-5000.

Cabling

A card-slot unit that supports unshielded twisted-pair, fiber-optic and RG-58 coaxial cable as well as standard AU1 transceiver connections in Ethernet networks has been introduced by **Cabletron Systems, Inc.**

Called the **Multimedia Access Center**, the unit is available with either two- or eight-digit card slots. Interface cards can be mixed within the access center or the unit can make up all of a single media interface.

In addition to supporting twisted-pair phone wire and providing the ability to mix media interfaces, the unit offers such software capabilities as remote network management, redundancy and self-diagnostics. The Multimedia Access Center repeats and self-configures each port regardless of the media interface. The repeater portion conforms to IEEE 802.3 specifications. Each port supports a 10M bit/sec. data rate, the vendor said.

Pricing depends on configuration. In general, the cost per connection is $495 for twisted-pair and $890 for fiber-optic cabling.

Cabletron, P.O. Box 6257, Rochester, N.H. 03867. 603-332-9400.

On April 16, 1987
IBM announced the world's
first thin-film superconducting device
that works at practical temperatures.

This advance followed
the breakthrough by two IBM scientists
whose discovery the previous year
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On May 11, 1987
IBM announced the
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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

The impact of nonimpact

The computer industry, like the automobile business, is a field in which selected technologies acquire the label of "hot product."

Those are the features and products that make a splash when first introduced — or at least redirected for a particular market segment — even though comparable technologies have been making low-key but steady gains elsewhere in the industry.

Such is the case with nonimpact printing. The splash for laser and other nonimpact printers came a couple of years ago when manufacturers such as Canon drove down the price of copier-based laser technology to a point that systems vendors such as Hewlett-Packard could offer lasers as relatively affordable peripherals for personal computers.

Since that time, much of the attention devoted to lasers has focused on how they work with PCs.

However, lasers actually predate PCs and have been making an impact on even the largest computing environments since companies such as IBM

Continued on page 73

IBM 3090 user spiced with TLC

Extra care taken for university's Model 120E vectorization test site

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Many times, those who are first in line to install a new computer get a little more attention. That appears to have been the case at the University of Illinois at Chicago (UIC), which installed the first IBM 3090 Model 120E last September.

The system, which is packaged with an IBM Vector Facility, is to be a testing ground for the vectorization of scientific problems that were previously solved through linear equations.

The first sign that IBM would give the site extra attention was when the company sent an IBM fellow to the public university in August 1987. The fellow, whose salary will be paid by IBM for one year, is helping scientists on the campus make the transition from scalar to vectorized code, said Thomas H. Brown, UIC's computer center director.

Such special arrangements between IBM and the academic community are not unusual. A Model 120E now being installed at North Dakota State University in Fargo includes a vector facility that IBM provided in exchange for the future development of vectorized chemical applications. IBM plans to remarket those vector applications to other users, which will not be done with the results of UIC's work.

Another sign of IBM's attention to detail in the UIC installation was the way IBM resolved a shipping error. Installation at UIC's computing center, located just west of downtown Chicago, came to a grinding halt the morning of Sept. 19, when a critical 400-lb. piece of cable was discovered missing. Even though it was a Saturday, IBM chartered a small plane to fly a duplicate cable from its Poughkeepsie, N.Y., mainframe facility to the computing center.

The need was critical, Brown said, since the university's 3081 Model K had to be unplugged to make way for the Model 120E. "Running in parallel is a luxury we've rarely been able to afford," he said.

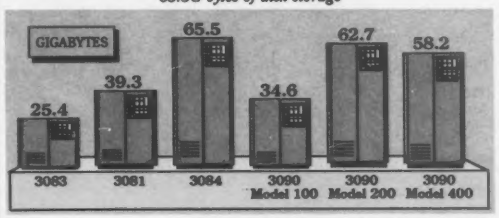
Previously, the IBM 3081 Model K ran all on-line VM/CMS applications in one of its CPUs while running all MVS batch applications in its second CPU. After the Model 120E's installation, the 3081 was devoted to on-line applications only, boosting the number of users on-line from 450 to 900. The IBM team picked up the installation in mid-afternoon, and the rest went

Continued on page 73

Data View

Big boxes, big disks

Large IBM mainframes support an average of up to 65.5G bytes of disk storage



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Elxsi hybrid system debuts

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — In a move to woo the commercial marketplace, Elxsi Corp. last week introduced a minisupercomputer called the Pegasus Superframe.

The system, set to be available late this year, is based on CPUs that process 25 million in-

Continued on page 70

Vaxstation foretells future?

BY STANLEY GIBSON
CW STAFF

The multiprocessing that was introduced with the Digital Equipment Corp. Vaxstation 8000 recently will likely lead the way as the first of several multiprocessor VAXs to be introduced by DEC this year, according to analysts.

"Multiprocessing is the jewel in the crown of Digital," said Marty Gruhn, president of Tempe, Ariz.-based research firm The Sierra Group. After the late spring announcement of Polar Star, a widely discussed peer multiprocessing mainframe-class VAX, DEC will introduce multiprocessing as a layer over all its product lines, Gruhn said.

VMS 5.0, which DEC reportedly will announce with Polar Star, is necessary to implement peer multiprocessing, but application software must be optimized in order for the benefits of

Continued on page 72

Inside

- Charles River Data adds multiprocessing version of supermicro, claims throughput tripled. Page 72.
- Acom releases 20 page/min. laser printer for shared-resource and word processing environments. Page 80.

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7224

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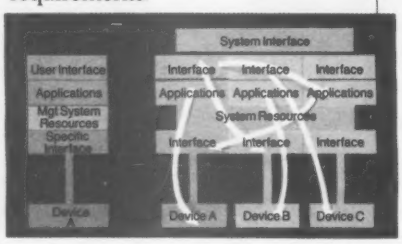
In today's multi-technology environments, even the best of today's traditional schemes can't keep pace with user demands for comprehensive network reliability, serviceability, and growth. That's because no single system has ever been able to address universal network management requirements.



When your network is simple, so is managing it. But when it grows with multiple technologies, most network management systems simply run out of steam.

To get maximum network performance in these complex environments, a new level of integration is required. Which requires a new concept. One that allows you to address current network management needs, yet ensures you of optimum control over your network, no matter how complex it may be, or may become in the future.

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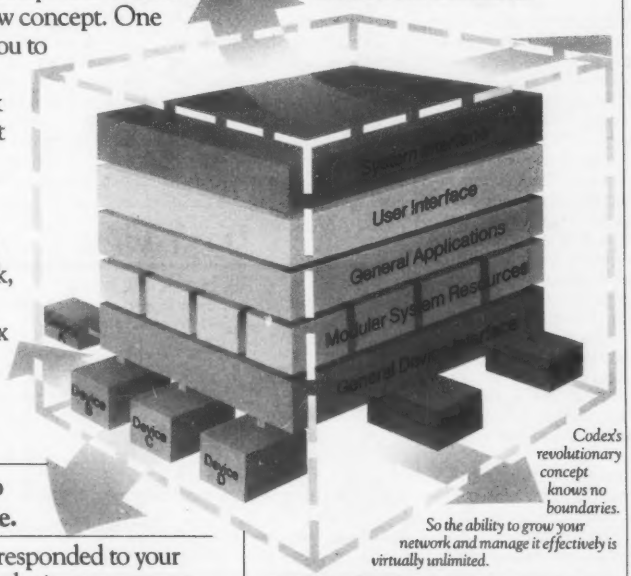

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Sales offices in more than 40 countries worldwide. In Europe call 32-2-6608980, in Canada 416-793-5700, in the Far East 852-5-666706 (in Japan 81-3-5848101). in the Americas 617-364-2000.

introducing innovative roducts. Now it's time for k management concept.

management concept, all network devices are treated consistently. In fact, it defines a relationship between all network devices and the management system – a relationship never before established. So one system will handle all architected devices, as well as give you the structure to manage unarchitected devices.

Standards Are the Roadmap.

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X.25 products, SNA gateways, experimental ISDN gateway
Network design and applications engineering support
National and multinational account management
Field service and customer education/training
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No matter what your networking needs, Codex has the solutions.

True Integration Is Here.

With our new concept, you'll be able to get one consistent view of the entire network topology. With a single management system you'll have the potential to manage and control your entire network – statistical and time division multiplexers, T1 muxes, modems, X.25 concentrators – and other network devices. And that includes access to your computing equipment.

And we've engineered a non-proprietary technology that can work with other systems – in conjunction with IBM's NetView, for example – to give users truly integrated control of their network.

This level of control allows you to *take decisive corrective action* to optimize network performance. Because the information and the management commands for your entire network are integrated and provide a unified database, one system provides full problem, fault, event and performance management – with extensive diagnostic, restoral, reconfiguration and reporting capabilities to maximize overall network availability.

Our new network management concept allows you to control your network no matter how far it reaches.

Call For More Information.

Obviously, there's lots more to tell than this space allows. To obtain a free brochure outlining our revolutionary approach to network management, call **1-800-426-1212, Ext. 246.** In Europe, call 32-2-6608980. Or write to Codex Corporation Dept. 707-46, Maresfield Farm, 7 Blue Hill River Road, Canton, MA 02021-1097. We promise it will change the way you look at network management forever.

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Visit Codex at Interface, March 28-31, Booth #1584.

Multiflow extends minisuper line with high-, low-end units

DALLAS — Multiflow Computer, Inc. built on the base it established last year in the minisupercomputer market with last week's introduction of high- and low-end systems.

The Trace 7/100 and Trace 14/200, which were announced here at the Uniforum show, bracket the performance of Multiflow's existing Trace 7/200 system. Like the Trace 7/200, the new systems are based on Multiflow's Trace Scheduling compacting compiler technology, which combines up to seven or 14 32-bit operations into a very long-instruction word for processing in a single clock cycle.

Multiflow said 19 Trace 7/200 systems were installed by the end of 1987, with most of the computers being used in applications such as electrical and mechanical design analysis, fluid dynamics and computational chemistry.

The high-end Trace 14/200 provides twice the performance of the Trace 7/200 and can initiate up to 14 operations with a 512-bit instruction word, according to Multiflow Vice-President of Marketing and Sales Robert Smith.

Peak performance of 30 MFLOPS

Smith claimed the Trace 14/200 has a peak performance rating of 30 million floating-point operations per second (MFLOPS) and 10 MFLOPS when running the Linpack benchmark. It costs $399,500 with 32M bytes of memory, 1.1G bytes of disk storage, Unix and other peripherals.

Smith, who pitted the Multiflow product line against that of Convex Computer Corp., said applications that lend themselves to parallelism benefit the most from Trace Scheduling but that some benefits are available for scalar processing.

In comparing Multiflow systems to the Cydrome, Inc. Cydra 5 data-flow computer, which was recently announced by Cydrome and Prime Computer, Inc., Smith claimed price advantages for the Multiflow computers even in areas in which the Cydra 5 and Trace systems' performance match.

The Trace 7/100 is the entry-level Multiflow system and has a base price of $197,500. It was designed to provide two-thirds the peak performance of the Trace 7/200.

Elxsi

CONTINUED FROM PAGE 67

structions per second (MIPS) and 10 million floating-point operations per second (MFLOPS), according to the vendor. The company said its performance claims are based on the the so-called Digital Equipment Corp. VAX MIPS measurement, in which a DEC VAX-11/780 is rated at 1 MIPS, and the Linpack 64-bit 10-by-10 matrix for MFLOPS. Elxsi's earlier System 6400 CPUs were rated at 7 MIPS.

A basic Pegasus system with a Model 6160 CPU, 32M bytes of memory, 823M bytes of storage, tape and operating system software is priced at $695,000. Fully configured, with 10 CPUs, a 250-MIPS, 100-MFLOPS Pegasus costs $4 million.

According to Elxsi, when fully configured, Pegasus has a greater transaction speed than IBM 3090 mainframes or DEC VAX 8800s for one-fifth the price.

The Model 6160 is intended to expand sales in commercial, industrial and defense applications, according to Elxsi. Elxsi's installed base is in the "low 80s," said David Dunlap, vice-president of finance and administration. "It's not as much as expected."

John Miles, director of computing and communication services at California State University in Sacramento, said he is "definitely interested in upgrading" his two Model 6410s. "Elxsi's support, both software and hardware, has exceeded our idea of the norm," Miles added.

On May 19, 1987
IBM announced
four new IBM 4381 processors.

They offer a
30% performance improvement
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and include a one-megabit chip
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IBM

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On June 16, 1987
IBM made the largest telecommunications
software announcement in its history.

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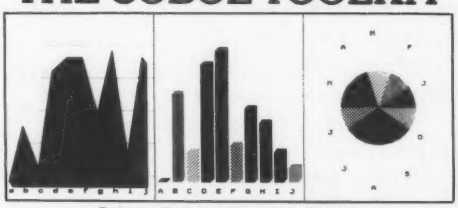

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Sony readies News for U.S. channels

BY NELL MARGOLIS
CW STAFF

NEW YORK — Undaunted by earlier failed attempts, Sony Corp. is again bidding to enter the U.S. computer market — this time with a recently unveiled Unix-based 32-bit engineering workstation.

Called Net Work Station, or News, the latest Sony is hard to distinguish from the offerings of Sun Microsystems, Inc., Apollo Computer, Inc. and Hewlett-Packard Co., which together command some 70% of the $2 billion U.S. workstation market. Sony is neither denying nor bemoaning this sameness; to the contrary, the company is capitalizing on it.

"The boxes themselves are very general-purpose. That's one of their biggest advantages — they can do whatever you want them to," said Richard Shah, western regional manager of Sony Microsystems Co., the Palo Alto, Calif.-based Sony subsidiary formed to market the News line.

News "is the closest thing yet to a generic workstation," said Anthony I. Wasserman, president of Interactive Development Environments, a San Francisco-based computer-aided software engineering (CASE) manufacturer and one of six software companies that have signed on as strategic allies of the fledgling Sony Microsystems.

Standards of living

From the Motorola, Inc. microprocessor to the University of California at Berkeley Unix 4.2 operating system to the Transmission Control Protocol/Internet Protocol to the windows, Wasserman said, what you see is the product of "a company that said, 'Let's build a machine that lives on standards.' "

Sony is initially targeting its workstations at the CASE and desktop publishing industries — niches in which, according to Shah, standardization has particular end-user appeal.

Slated for April shipment, the first editions of News are the NWS-711, priced at $3,995, and the NWS-841, which costs $19,900. The two work in tandem, with the NWS-841 acting as a file server to the diskless NWS-711s. The NWS-841, Shah said, features a dual-processor architecture that substantially speeds I/O. Sony Microsystems, which will manufacture its workstations in California and sell them through OEMs and value-added resellers, is also banking on its household name to boost it into the U.S. computer market.

Even with standardization and software partners thrown in, that may not be enough, according to Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco.

"They failed in the PC business, which is a little more forgiving than the workstation market," Herwick pointed out. What's more, he said, "The $500 to $1,000 you save by choosing Sony over Sun just isn't a big enough price break, especially when you add in that Sun offers a wide range of systems and connectivity."

Qantel adds high-end minis

HAYWARD, Calif. — Qantel Business Systems, Inc. recently continued the replacement of its line of small business systems with the introduction of three minicomputers.

The high-end announcements followed the company's 1987 introduction of the System 43 desktop multiuser system and the low-end System 15, which the company billed as an IBM Personal Computer AT-compatible model designed to migrate users from single-user PC environments to multiuser systems based on Qantel's Best/AOS operating system.

The new models — the System 65, 68 and 88 — were designed to support between 20 and 50 terminals in typical environments, according to Qantel.

The System 65 is 1.4 times faster than the earlier System 55 and has twice the basic memory, with a memory range of 4M to 16M bytes, according to the vendor. The System 65 is based on Qantel's single-board Q32 processor and supports up to three disk drives with capacities up to 160M bytes each as well as a quarter-inch tape drive.

Added features

The System 68 also is based on the Q32 but features 8M to 16M bytes of memory, optional half-inch reel and cartridge tape drives and an optional peripheral expansion cabinet for mounting disk drives of up to 430M bytes of memory.

The System 88 is based on Qantel's multiboard Q299 processor and is available with 8M to 16M bytes of memory. The System 68 supports 25 to 30 users in a typical environment, and the System 88 supports 50, according to Qantel.

The systems are available now at prices ranging from $50,000 to $200,000.

Qantel, which sells its systems through a direct sales force and value-added dealers, is targeting vertical markets with the systems and its proprietary software, which includes manufacturing resource planning, retail and hospitality and leisure software.

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Supermicro throughput tripled

Charles River adds multiprocessing versions to Universe line

BY STANLEY GIBSON
CW STAFF

FRAMINGHAM, Mass. — Tripling the throughput of its systems, Charles River Data Systems, Inc. recently introduced multiprocessing for its Universe family of supermicrocomputers.

The multiprocessing is offered in two modes: peer multiprocessing, in which up to seven processors execute a program together; and auxiliary multiprocessing, in which one processor can be dedicated to a single task separate from the other processors.

Both are supported under Release 8 of Charles River's Unos operating system, which was also announced recently.

Richard Swee, Charles River's vice-president of engineering, said no applications or operating system changes are required for multiprocessing.

The multiprocessors are available in two configurations: one with the Motorola, Inc. 68020 microprocessor and another with the Motorola 68030.

MIPS rating

A four-processor 68020-based CPU was rated by Charles River at 12 million instructions per second (MIPS), although larger systems have yet to be benchmarked, Swee said. Each 68020-based CPU is rated at 3.5 MIPS, he added. A 68030-based system is rated at 5 MIPS per processor, but 68030-based systems have not been tested completely, according to Swee.

The systems, which will be sold through OEMs and value-added resellers, are intended primarily for factory process control, transaction processing, data entry and teleprocessing applications.

A four-processor version has a suggested price of about $50,000 and includes 140M bytes of disk storage, 2M bytes of memory, an operating system license and a tape drive, according to the vendor.

Solid-state system aimed at Unisys

MILPITAS, Calif. — Zitel Corp. recently targeted Unisys Corp. mainframe users with a semiconductor-based storage subsystem designed to provide faster I/O than an electromechanical disk subsystem can.

Zitel claimed its Ramdisk/ALX holds a fourfold throughput advantage in comparisons with Unisys thin-film disk drives while providing up to 1G byte of on-line solid-state storage.

The Ramdisk/ALX is intended for use with Unisys A, B and V series mainframes and medium-scale systems in on-line and batch applications in industries such as banking, insurance, health care and manufacturing as well as in government agencies. The subsystem is based on 1M-bit dynamic random-access memory chips and connects to standard sequential Unisys Data Link Processors.

Zitel said the Ramdisk/ALX appears to the host as a disk drive and can process more than 1,200 I/Os per second.

The subsystem features up to eight ports, battery backup, single- and double-bit error detection and automatic error correction, according to Zitel.

The company also claimed that the Ramdisk/ALX can extend the life of installed magnetic disks by reducing actuator activity. Prices start at $159,000 for the Ramdisk/ALX with 128M bytes of storage. A 1G-byte system starts at $610,000.

Vaxstation

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multiprocessing to be realized, she said.

The Vaxstation 8000 is built around two buses — the VAXBI bus and another proprietary graphics bus — both of which operate at the same speed. A series of graphics processors are attached to the graphics bus, and a VAX 8250 and three DEC Microvax II processors are attached to the VAXBI bus. One Microvax II serves as a tape and Ethernet controller, another acts as a disk controller, and the third controls the graphics bus interface.

"It keeps traffic off the 8250 CPU and spreads the power around," said Ron Ginger, product manager for the Vaxstation 8000. Ginger pointed out that this is not the first use of the Microvax II chip as a controller; it is also used in the Ethernet controller in 8000 series VAXs.

Maintains speed

Although the division of labor among several different processors means that the figures for millions of instructions per second will never be as high as single-processor machines from competitors, the Vaxstation 8000 has the benefit of not losing any performance when more than one task needs to be done, Ginger explained.

Although Ginger declined to elaborate on future versions of the high-end Vaxstation, some analysts said that adding more powerful processors to the system's VAXBI bus could be readily done.

The VAX 8250 could be replaced with a more powerful VAX processor. In addition, the CMOS-based Microvax 3000-type processors could take the place of Microvax IIs, according to Craig Symonds, an analyst with the Gartner Group, Inc. in Stamford, Conn.

"This product was way out of sync. The 8250 was too small, but they needed something to attach to the BI bus," said John Logan of The Yankee Group in Boston. He suggested that the VAX 8250 will be replaced with another processor as soon as it is appropriate.

Logan said DEC has indicated to him that a future implementation of the Vaxstation 8000 could be as a server on a network. "Who else on the market has something like this? It's not an impractical solution," he added.

"Digital loves to use a Cray on a network. They are intrigued by the server concept," Logan continued, citing the use of DEC's gateway to Cray Research, Inc. supercomputers. DEC "is not the leader in single-user systems, and they won't be the leader," he added.

Ginger said the system can be used as a two-dimensional graphics server now, thanks to its implementation of the X Window standard. An X Window specification for three-dimensional work has not been made yet, but when it is, the workstation will implement it, Ginger said.

Further describing the Vaxstation 8000's architecture, Ginger said the VAXBI bus was necessary because a speed of 13.3M byte/sec., as well as the larger address space of the bus, was needed.

Microvax IIs were selected as controllers because of their ready availability at DEC and because of the manufacturer's familiarity in using them for various tasks. In addition, the VAXBI protocols assume that intelligent, autonomous devices are attached, Ginger said.

A similar bus and processor arrangement can be made wherever better performance can be achieved by separating work into several kinds of tasks, Ginger said. As to whether or not users can expect to see such implementations in the future, he said, "Stay tuned."

On June 16, 1987
IBM also announced enhancements
to the IBM Token-Ring local area network
designed to help computer users
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Which is just one reason
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On July 20, 1987
IBM began volume shipments of the
mid-range IBM 9370 Information System
two months ahead of schedule.

So now a broad set of users can
enjoy the power of the popular
IBM System/370 architecture
even sooner than expected.

IBM

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Connolly

FROM PAGE 67

and Xerox announced mainframe-class lasers more than a decade ago.

What's happening today is that nonimpact printers are having a major impact on all segments of the corporate computing operation and are steadily replacing line printers.

Perhaps the most significant developments outside of the PC environment have been in the mid-range of the printer market, in which the appearance of nonimpact printers — whether based on laser, ion deposition or other technology — is the norm rather than the exception.

Impact needed

Numerous MIS managers report that they are currently producing the majority of their reports on nonimpact printers. Those managers acknowledge, however, that they likely will always need impact printers — spewing out noise along with their green-and-white fanfold paper — particularly for multipart forms.

But those managers are relying more and more on the nonimpact printers that are producing 30 to 100 pages per minute with increased flexibility in areas such as paper handling and graphics, and with rapidly improving price/performance levels.

The question is, Will anybody miss that green-and-white paper and the chug-chug of a line printer?

Connolly is *Computerworld's* senior editor, systems & peripherals.

Pixar adds simplified imaging computer

SAN RAFAEL, Calif. — Pixar recently introduced a reengineered version of its Pixar Image Computer with limited expansion capability in an attempt to expand its market niche.

According to Pixar, the Pixar II is a high-resolution imaging computer designed for use in medical, remote sensing and mapping and animation applications.

The Pixar II, priced at $29,500, includes 12M bytes of memory and software. The original Pixar, introduced in 1986, costs $49,000.

The Pixar II has two slots for memory expansion. A 12M-byte board costs $17,500, and a 48M-byte board is available for $35,000.

The original Pixar can be expanded to contain 192M bytes. Both computers run at 40 million instructions per second, and both computers' pixels are 48 bits deep, Pixar claimed.

Multiple Chaps

The Pixar II is available with one or two channel processors; the original Pixar can be expanded to three channel processors. The channel processors, called Chaps, are composed of four parallel processors.

Pixar also announced that a video merge capability option to align or compare two images will be available this summer for $28,000.

It includes 12M bytes of memory. The merge option is designed to superimpose images without altering the data.

Both the Pixar and the Pixar II must be attached to a host made by Sun Microsystems, Inc., Symbolics, Inc., Digital Equipment Corp., Silicon Graphics, Inc. or Apollo Computer, Inc.

3090

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flawlessly, Brown said.

The Model 120E's three primary jobs are to run vector equations; to support all university MVS batch applications, primarily those for scientific research; and to support the university library's electronic card catalog application. To do those jobs, UIC installed a Model 120E with 32M bytes of memory and 16 channels. The vector facility is mounted in a cabinet that forms a T figure against the main processor cabinets.

The 8 million instructions per second (MIPS) Model 120E serves as an in-house vector processing resource for the university's faculty and its 25,000 students.

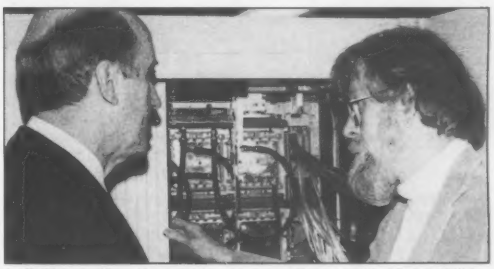
Until now, vector equations written in Fortran had been run at the University of Illinois at Champaign-Urbana and a supercomputing center at Cornell University sponsored by IBM, where UIC has visiting rights. Using the national Bitnet network, UIC faculty have been able to run their programs at the supercomputer facilities by dialing in code from their Chicago offices.

Price a priority

Pricing was a consideration in obtaining the Model 120E for the UIC campus. It is the entry-level machine in the 3090 family, but since it is water-cooled, users can build up to a Model 150E, 180E or 200E through field upgrades.

"We've decided to buy capacity in the smallest increments possible," Brown explained. "In two to three years, we may need a Model 150. But if I can postpone that buying decision, it will be cheaper at that time." The university computing center currently has a staff of 55 and a $3 million budget, much of which is used for personnel costs.

Although UIC did not receive any special discount in exchange for development work, the Model 120E was bought at the university rate of 20% less than IBM list price, Brown said. UIC was also pleased when IBM moved up the installation date from December 1987.



UIC Chancellor *Donald Langenberg, Brown with Model 120E*

In the planning stage, UIC had considered the purchase of a used IBM 3081 before deciding to buy the Model 120E. A second 3081 would have matched UIC's existing 64M-byte 3081 Model K. Eventually, Brown chose the purchase of the Model 120E because it offered more flexibility and better price/performance.

"Getting another 3081 wouldn't have given us the vector capability," Brown concluded. "It was 50% bigger in size than the 120E, and there was no upgrade path to other 3090 machines." The Model 120E is linked to the older IBM 3081 via one channel-to-channel connector.

Brown said the Model 120E installation was not the first instance in which UIC played a role in the early installation of IBM products. The university was a beta-test site for early releases of MVS, he said.

UIC maintains a relationship with Cornell's IBM 3090 supercomputer project and with a National Supercomputing Center at the University of Illinois at Champaign-Urbana.

On August 4, 1987
IBM announced a computer
that's twice as fast as the original
IBM Personal Computer
and 40% smaller.

A fact that makes
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an intelligent choice
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On September 1, 1987
IBM announced the IBM 3380 Model K
disk storage unit, the most
advanced in the industry.

It can store 7.5 billion characters
of information—a capacity 1,500 times
that of the original IBM 305 RAMAC
system of the 1950s.

And it can do it at less cost—
about 700 times less.

IBM

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NEW PRODUCTS

Turnkey systems

Masscomp recently introduced three industrial measurement system packages that integrate data acquisition hardware and software under its Laboratory Workbench user interface.

The systems include a 32-bit Motorola, Inc. MC68020 CPU with floating-point accelerator, an 8M-byte parity memory module and a 318M-byte 5¼-in. Winchester disk drive. Software includes an imaging graphics subsystem and a Unix-compatible operating system.

The single-processor **IMS 5550-01**, priced at $95,475, includes a 16-channel, 12-bit analog-to-digital converter, expandable to 256 channels.

The dual-processor **IMS 5700-01**, priced at $158,792, includes a synchronous memory interconnect running at 26M byte/sec. that links up to four processors, system memory and two optional vector accelerators.

Masscomp also announced two Signal Analysis System packages priced from $133,300.

Masscomp, One Technology Park, Westford, Mass. 01886. 617-692-6200.

Processors

Scientific Computer Systems Corp. has announced an **Extended Memory** feature that offers 1G byte of memory for enhanced high-performance computing on the vendor's supercomputer systems.

Included in the option is an upgrade from the Cray Research, Inc. X-MP/24 instruction set to the functionality of the Cray X-MP/416. The option also implements gather/scatter and compress index instructions on the vendor's SCS-40, which consists of advanced vector instructions providing support for high-speed indirect addressing of array elements.

The Extended Memory option is priced at $16,000 per megaword.

Scientific Computer Systems, 10180 Barnes Canyon Road, San Diego, Calif. 92121. 619-546-1212.

A multiple microprocessor-based system called **Hyperflo** has been announced by **Pacific Cyber/Metrix, Inc.**

According to the vendor, the Hyperflo system is currently implemented on the Motorola, Inc. VMEbus and employs Motorola's 68020 microprocessor. Processor boards carrying four 68020 processors and two floating-point processors are standard.

Also included are a system resource board, a memory control board and one or more global memory boards. A read-only memory board can be added for storing application software modules. Up to 18 processor boards can be added, as can more memory control boards.

Other features include a built-in runtime operating system, support for Unix and software development tools.

A basic system is priced at $20,300.

Pacific Cyber/Metrix, 6805 Sierra Court, Dublin, Calif. 94568. 415-829-8700.

An attached processor for use with Digital Equipment Corp. VAX computers has been announced by **Computer Maximizers, Inc.**

Called **V/Max**, the processor is available in C, Fortran and Pascal compilers. It runs at 3½ to 4 million instructions per second (MIPS). The floating-point multiply time is 437 nsec. Specific CPU-bound programs are run on the V/Max-attached processor instead of on the CPU, relieving the VAX of extensive processing loads.

According to the vendor, one or more V/Max attached processor boards may be added to any VAX system.

V/Max is available on a monthly rental basis for $9.83 per day per MIPS.

Computer Maximizers, 15187 Springdale St., Huntington Beach, Calif. 92649. 714-897-5096.

A Q-bus-based system said to be compatible with Digital Equipment Corp.'s LSI-11 computer has been announced by **Scientific Micro Systems, Inc.**

The **SMS 1000 Model 38** includes a Winchester hard disk drive, an LSI-11/23 or LSI-11/73 CPU, four or eight serial ports, a selection of removable media and a five-slot quad-height Q-bus backplane. It supports real-time and time-sharing operating systems. Storage devices range from enhanced small device interface to quarter-inch cartridge tape or 5¼-in. floppy disk load and backup devices.

Pricing ranges from $3,000 to $17,000.

Scientific Micro Systems, 339 N. Bernardo Ave., Mountain View, Calif. 94043. 415-962-5459.

A 16-channel I/O subsystem for reducing processor and bus load in VMEbus applications has been introduced by **Plessey Microsystems, Inc.**

The **PME SIO-4** is an intelligent serial communications controller with an on-board Motorola, Inc. 68020 processor optimized for use in both Unix-based and real-time applications.

Features include a minimum of 1M byte of random-access memory dual ported to the 68020 processor and the VMEbus. Also included are 16 RS-232-compatible asynchronous channels running at speeds up to 38.4K bit/sec. and two channels that support synchronous or asynchronous operation and 128K bytes of read-only memory.

The PME SIO-4 costs $2,695.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965. 914-735-4661.

A 32-bit array processor featuring up to four computational processors and a peak speed of 72 million floating-point operations per second (MFLOPS) has been announced by **Floating Point Systems, Inc.**

The **MP32 SSP** offers directly addressable memory and can be configured with from 1 to 16 megawords of memory. It is available with Digital Equipment Corp. interfaces including Q-bus, Unibus and VAXBI.

Mpfortran, a Fortran language environment, is available for the MP32 SSP. Designed for use with the system's parallel processing architecture, it supports the use of data flow analysis to reduce the parallel programming effort. Also included are more than 250 math routines and parallel processing constructs.

The MP32 SSP costs $57,500.

Floating Point Systems, 3601 S.W. Murray Blvd., Beaverton, Ore. 97005. 503-641-3151.

Compupro, a division of Viasyn Corp., has added four low-end models to its **MP Series** of mid-range multiuser systems.

The MP100 series supports two to six users, provides application transfer across the entire multiuser system and offers a range of industry-standard application software and data communications options. All models feature modular architecture to allow for expansion of memory and data storage.

Features include a 12-MHz Intel Corp. 80286 host CPU, a 12-slot enclosure, 10 serial ports with DB-9 connectors, a parallel printer port, 1M byte of random-access memory, a 51M-byte hard disk and a 5¼-in. floppy disk drive.

Prices range from $7,995 to $10,495.

Compupro, 26538 Danti Court, Hayward, Calif. 94545. 415-786-0909.

Graphics systems

Imaging Technology, Inc. has added four products to its image processing product line.

The **DP-200** and **HRDP-200** display processors integrate with the vendor's Series 200 product family. The DP-200 provides 1,280- by 1,024-pixel resolution, a 60Hz noninterlaced scan rate and a display of up to 4,096 simultaneous colors. The HRDP-200 features 2,048- by 1,536-pixel resolution, on-board

Continued on page 76

On September 7, 1987
most everyone at IBM stayed home.

It was Labor Day.

IBM

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On October 6, 1987
IBM announced a worldwide family of innovative computerized telephone branch exchange (CBX) systems.

In fact, the IBM 9751 CBX,™
developed by ROLM, requires 70% less space and can handle 70% more voice and data than our previous CBX systems.

So whether your business uses
100 phone lines, or 20,000, give us a call.

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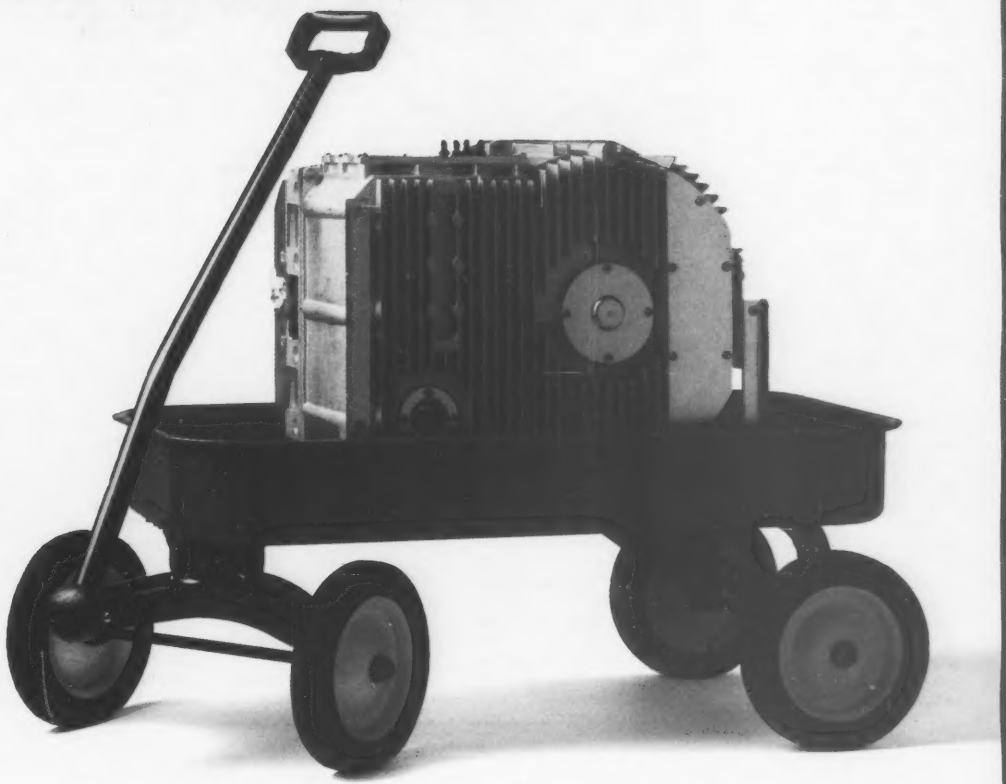
How our storage products' technology can boost your systems' productivity. No. 2 in a series.

Fully sealed. Runs cool. Fits under an airplane seat. And comes 4 to a box.



Do you know what it is?

It's one of our direct access storage device's (DASD) disk enclosures, and it delivers improved reliability, improved availability and greater compactness.

Here's why:

It's small—60 lbs. vs. 140 for the industry standard's—because its disks are small—10.5" in diameter vs. 14" for the industry standard's.

This is why these disks can be sealed inside their enclosures... which makes them less susceptible to environmental contamination.

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Continued from page 74

graphics and output lookup tables for gray scale image manipulations. The display processors cost from $53,995 to $58,995, respectively.

Imageaction 200 is an interactive menu-driven software package featuring a hierarchical structure, Help facilities and support for user-defined functions. It costs $2,995.

The single-board floating-point **IPA-150 Image Processing Accelerator** was designed specifically for image processing applications. It costs $7,995.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

A high-speed programmable processor for bit-mapped graphics systems has been introduced by **National Semiconductor Corp.**

Called the **DP8500 Raster Graphics Processor**, the chip features a 100-nsec bus cycle time on back-to-back vector and block operations. It works with all types of memory, according to the vendor, and can access frame buffers in both planar and pixel fashion.

Scheduled to be available in the third quarter, an evaluation board is available now for $1,495. Production pricing will be $95 for quantities of 10,000 or more.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052. 408-721-6528.

Data storage

Tab Products Co. has added the **Series 2000 LD** and the **Series 2000 SD** to its line of laser-optic filing systems.

The Series 2000 LD includes a 2.2 page/sec. scanner with multiple scan resolutions, combined flatbed and automatic sheet feeder capability, a 19-in. landscape display, a laser printer, a 12-in. optical disk drive and an IBM Personal Computer AT.

The Series 2000 SD offers the same features and capabilities as the 2000 LD using a 5¼-in. optical disk drive.

Tab's *Series 2000 LD*

Both systems use a small computer systems interface that allows connection of up to seven devices.

The Series 2000 LD costs $69,995. The Series 2000 SD costs $49,995.

Tab Products, 1400 Page Mill Road, Palo Alto, Calif. 94304. 415-852-2400.

A dual-emulation tape coupler said to interface industry-standard half-inch tape transports to Digital Equipment Corp. Q-bus computers has been introduced by **Emulex Corp.**

The **QT13** tape coupler offers DEC TMSCP and TSV05 compatibility as a switch-selectable option, the vendor said, providing the ability to interface with both the complete Q-bus family and Microvax systems.

Features include a set of self-diagnostics and adaptive direct memory addressing and 22-bit addressing switch-selectable options. The QT13 handles tape interface data rates to 1M byte/sec.

The QT13 costs $1,095.

Emulex, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

A tape duplication system that supports Digital Equipment Corp.'s TK50 half-inch cartridge tape drive has been announced by **Applied Data Communications, Inc.**

The **CD-2500** supports industry-standard half-inch tape formats used on DEC VAX and PDP-11 systems. It also supports most quarter-inch compatible (QIC) formats for quarter-inch cartridges in capacities ranging from 20M bytes per 4 tracks to 125M bytes per 15 tracks. According to the vendor, up to 16 individual tape drives in any combination of formats can be interfaced to each CD-2500.

The CD-2500 costs $39,950, including a monitor and four QIC-11 or QIC-24 drives.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680. 714-731-9000.

A high-speed storage-module drive disk controller for use with Sun Microsystems, Inc. workstations and file servers has been announced by **Interphase Corp.**

The **V/SMD 4400 Phoenix** is said to be capable of interfacing up to four storage-module drive disk drives to a Sun workstation or file server.

It features the vendor's Bus-packet Interface and Virtual Buffer Architecture, which preformats packets of data in memory first-in, first-out fashion before acquiring control of the host system's Motorola, Inc. VMEbus.

Other features include installation software, boot read-only memories, a full-function queueing driver, a runtime formatter and other utilities.

The V/SMD 4400 Phoenix is priced at $3,350.

Interphase, 2925 Merrell Road, Dallas, Texas 75229. 214-350-9000.

Terminals

IBM's Information Systems Group has announced display stations for its mainframe and minicomputer systems.

The **IBM 3206** display station Models 100 and 110 are 1,920-char., 15-in. green monochrome CRTs with smudge-resistant screens for use with the IBM 3090 Processor Complex. The display stations replace the IBM 3180 Models 140 and 145. Functions include increased record/play/pause capability, rule and lighter weight. They cost $2,695 each.

The **IBM 3192 W** models are part of the 3270 Information Display System. With up to 3,564 characters, the 15-in. black-on-white CRT offers a smudge-resistant screen and the functions of the IBM 3180 Model 1. Features include printer port, record/play/pause capability and rule and set-up mode. Prices range from $1,995 to $2,145.

The **IBM 3197 W** models are enhanced follow-ons to the IBM 3180 Model 2. The IBM 3197 W models' 15-in. black-on-white CRTs display up to 3,564 characters. Support for ASCII printers, two display sessions or one display and one printer session concurrently is included. Pricing ranges from $1,995 to $2,145.

IBM, 900 King St., Rye Brook, N.Y. 10573. 914-765-3064.

A time and attendance terminal featuring a message system and bulletin board has been announced by **NCR Corp.**

The **NCR 2845 Time and Attendance terminal** collects and stores up to 1,500 transactions of attendance information in its own 16K-byte random-access memory. It transmits its information to a host computer for payroll calculations.

Features include an employee status file, a 20-key keyboard, an internal clock and a 72-hour battery. The NCR 2845 is supported on the NCR Tower and personal computer lines by the NCR Labor Management System software package.

The terminal is priced at $1,100.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio, 45479. 513-445-4169.

Decision Data Computer Corp. has announced its **Personal Workstation Model 5052**, said to be compatible with IBM System/34, 36 and 38.

The system is said to be capable of emulating seven System/34, 36 or 38 devices simultaneously, including one defined as a printer. It uses an Intel Corp. 80286 processor and features a built-in 20M-byte hard disk drive.

Other features include a windowing/status display system, a

Continued on page 80

On October 13, 1987
The American Society for Quality Control
announced that, for the second year
in a row, its poll of over 600 senior executives
associated IBM with high quality
more than twice as often as any other
company named in the survey.

And during National Quality Month,
that's an association that would make
any company proud.

IBM

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On October 20, 1987
IBM announced its newest addition
to the System/3X family of computers.

System/36 Model 5363, the smallest
System/36, can be installed in as little as one
hour by customers with no knowledge
of data processing.

This helps explain why this family,
with more than 250,000 installed, is the most
popular mid-range system in business.

IBM

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"What if...

What if the cost of owning your next computer was cut almost in half?

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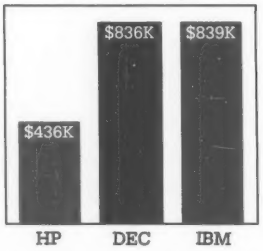
You'd have your computing power for a lower cost-of-ownership.

Up to $400,000 lower, in fact.

Based on original purchase price and support costs over five years.*



Because the HP 3000 Series 950 costs about half of IBM's 4381-23 or DEC's VAX 8700.

For a comparable class of computer.

Remarkable savings, you'll agree. Savings made possible by HP's remarkable new RISC-based Precision Architecture computers.

RISC—Reduced Instruction Set Computing—is a new concept in designing computers which, through simplification, can speed up computer processing.

Instructions are executed in hardware.

And advanced hardware technologies like VLSI are utilized, so that an entire CPU is on a single chip.

It all means fewer components.

And it all results in significant advantages in terms of reliability, as well as cost-of-ownership and performance.

Advantages which the HP 3000 line will maintain in future models.

To keep on giving you a lot more for a lot less.

The powerful HP 3000 Series 950: one of a full line of compatible mid-range computers.

*Based on US list prices available as of December 1, 1987.

You'd have true multi-vendor connectivity.

We know you want more networking options, not less.

Hence the HP commitment to a networking strategy that gives you the true multi-vendor connectivity that proprietary networks simply can't deliver.

HP AdvanceNet.

A strategy which adheres to industry standards.

And which supports de facto standards such as SNA.

For example, HP AdvanceNet is based on the OSI seven-layer model. Our HP StarLAN office networking is based on IEEE 802.3. And our X.25 Private Wide Area Network is based on CCITT standards.

It's this commitment to true multi-vendor networking that will allow you to keep your networking options open in the future, and will protect your existing systems investment.

An example of HP's commitment to standards is HP StarLAN office networking.

It's a long-standing commitment.

Supported by a broad range of networking products.

And by years of experience (over 60,000 nodes installed since 1971).

It's a commitment that extends to service and support.

From planning through maintenance. With proven services designed expressly for your multi-vendor network.

Because that's the real world.

You'd have easy access to your entire information system.

Introducing the HP NewWave environment.

An application environment based on MS™-DOS and Microsoft® Windows 2.0 that lets your people access, manipulate and share information throughout the system.

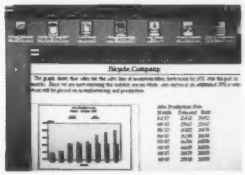
Effortlessly.

By means of simple, intuitive icons. Pull-down menus. A "mouse." And a common interface across workstation applications.

The NewWave environment incorporates two breakthrough technologies, the HP Object-Management Facility (OMF), and "agents," which together allow users to focus on their business tasks, not their computing tools.

OMF enables users to combine and manip-

wlett-Packard partner?



A window to your world.

ulate different data forms— text, spreadsheets, graphics, images, even voice—from disparate sources throughout the system.

All as easily as if working in a single application.

Then, just as easily, the results can be mailed to anyone on the system.

And in the NewWave environment even the novice user can be more productive.

HP integrated workstations with the NewWave environment.

What's more,"agents," which are practical implementations of artificial intelligence principles, can learn and perform repetitive tasks for your users. For example, "agents" can automatically update and distribute a sales report. On a prescribed day, at a certain time.

Furthermore, the environment will run under OS/2, and support Microsoft's Presentation Manager, once they're available.

NewWave.

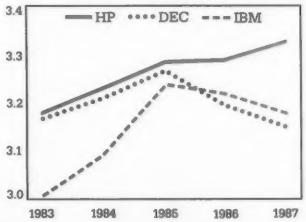
It will lead the way to a new and more productive era in computing.

You'd have the company with top ratings in customer support satisfaction

No two customers are the same.

This is a guiding principle of the HP way of doing business.

Customer Support Satisfaction.



It means asking a lot of "What if..." questions so that solutions can be tailored to your specific needs.

Instead of off-the-shelf solutions routinely handed out.

And it means following up with service and support.

Consider this record: #1 for five straight years in the widely-respected Datapro customer surveys.

It's a record based on an average across six key service and support categories: maintenance effectiveness, maintenance responsiveness, troubleshooting, documentation, education and software support.

And it's a record that should come as no surprise.

Because when you make your customers number one, they do the same for you.

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NEC releases hard-disk Multispeed lapto
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Hot future for DP pros
Broker workstation tools
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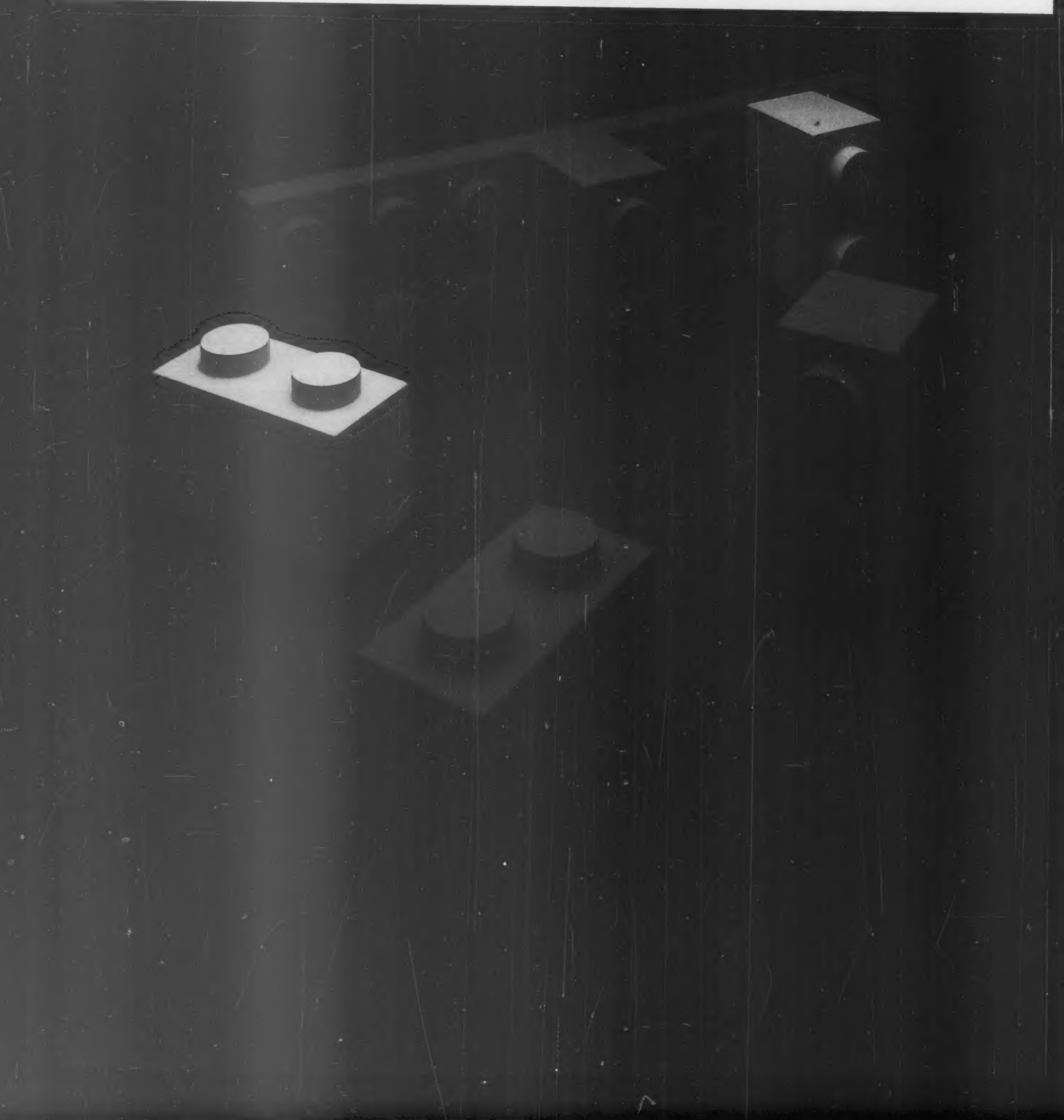
DB2 security

The big idea behi you can't



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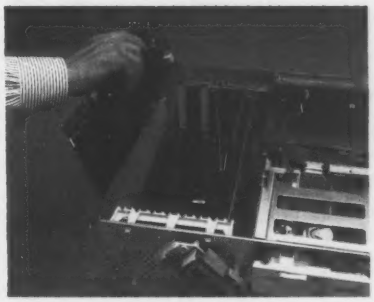
It's so simple: a building block approach that makes upgrading our new computers a snap. Literally. It's the PC design for the '80s. *And* the '90s. Because it protects your PC investment against obsolescence. Wyse calls it Modular Systems Architecture.™



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Continued from page 76
data/software security system and a 64-color screen.

The Personal Workstation Model 5052 is priced at $4,360.

Decision Data Computer, 100 Witmer Road, Horsham, Pa. 19044. 215-674-3300.

Printers/Plotters

A 1,000 line/min **band printer** said to be plug-compatible with the Hewlett-Packard Co. HP 3000 computer has been announced by **Interscience Computer Services, Inc.**

The printer features a built-in diagnostic display; floor-length acoustical cable and a combination of the friction-free hammerbank and a laterally moving full-font steel band.

The printer is priced at $12,165.

Interscience also announced a 600 line/min band printer called the **LB662**, designed for use with IBM System/34, 36 and 38. It costs $9,950.

Interscience, 5171 Clareton Drive, Agoura Hills, Calif. 91301. 818-707-2000.

A printer controller said to permit IBM System/34, 36 and 38 users to generate precision-tabbed labels, forms, graphics, logos and bar codes has been announced by **Decision Data Computer Corp.**

The **DDCC Magnum Controller** was designed for use with the company's 6700 series matrix printers. It allows the printers to generate optical-character recognition text and to print up, down and sideways in addition to top to bottom. Standard matrix characters, solids, halftones, reversed, shaded, striped, half-dot bar codes and standard bar code characters are available.

The controller supports all IBM System/34, 36 and 38 Advanced Printer Functions and emulates IBM 5224 and 5225 printers.

The DDCC Magnum Controller costs $995.

Decision Data, 400 Witmer Road, Horsham, Pa. 19044. 215-674-3300.

A laser printer for shared-resource and word processing environments has been announced by **Acom Computer, Inc.**

The 20 page/min printer, called the **Office Manager LX3820**, emulates either an IBM 5219 to an IBM System/36 or 38 or a Hewlett-Packard Co. Laserjet Plus to an IBM Personal Computer.

Duplex printing allows four-up image printing on 8½- by 11-in paper. Up to 2,500 sheets of paper can be accommodated. Other features include 34 resident fonts with three font cartridge slots; bold, underline, subscript and superscript support; and proportional spacing with right margin justification.

The Office Manager costs $24,995 without duplex capabilities or $28,495 with them.

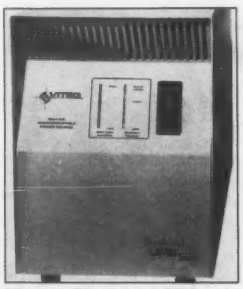
Acom, 3534 Atlantic Ave., Long Beach, Calif. 90807. 213-424-2986.

Power supplies

The **Benchmark UPS** series of 750VA to 1.5-kVA on-line uninterruptible power supplies has been introduced by **Viteq Corp.**

The Benchmark UPS units are said to protect data processing and industrial equipment from line disturbances and to provide output power in the form of a true sinusoidal waveform voltage.

The series includes three models: the UPS 386 for general use; the UPS 386 LAN, which includes a Novell, Inc. network interface for network power fault diagnosis and orderly system shutdown and is for Intel Corp. 80286- or 80386-based file servers; and the UPS 1.5 kVA, which was designed for minicomputer equipment.



Viteq's *Benchmark UPS*

Prices range from $1,795 to $2,795.

Viteq, 10000 Aerospace Road, Lanham, Md. 20706. 301-731-0400.

Deltron, Inc. has announced the **Standby Systems Series FL04** and **Series FL06 to FL15** as battery backup for minicomputers and microcomputers.

The Series FL04 provides 400VA output power, 10 minutes runtime at full load and 25 minutes runtime at half load. Transfer time is 4 msec, the vendor said.

Series FL06, FL08, FL12 and FL15 models provide 600, 800, 1,200 and 1,500VA output power, respectively, and up to 80 minutes runtime at half load. Transfer time is also 4 msec.

Standby Systems models feature common mode/transverse mode noise reduction and sine wave output. Prices range from $645 to $1,545.

Deltron, P.O. Box 1369, Wissahickon Ave., North Wales, Pa. 19454. 215-699-9261.

Input devices

Wedge reader support for Digital Equipment Corp. VT320 terminals and IBM Personal System/2s has been announced by **Intermec Corp.**

Intermec has enhanced its **Model 9570** to provide support to the PS/2. The **Model 9570AB Wedge** supports the VT320. The wedge readers transmit data entered through the wedge as if it were entered through a keyboard, the vendor said. Both readers work with either a laser scanner, a digital wand or a slot scanner. Data may also be uploaded through the readers' auxiliary RS-232 input port.

Other features include 16-bit microprocessors, decoding algorithms and the ability to read and automatically discriminate major bar code symbols.

The Models 9570 and 9570AB cost $495 and $595, respectively.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98046. 206-348-2600.

The **Eagle 1650** and **Eagle 1680** — large-format document scanners for use with Apollo Computer, Inc.'s Domain, Digital Equipment Corp. workstations or IBM Personal Computer ATs — have been announced by **Ana Tech Corp.**

The scanners, designed to convert line-art drawings into raster formats, feature a continuous-feed roller that can scan documents from 1- to 17-in. wide by roll length. The scanner accepts paper, mylar, vellum or film up to 0.01-in. thick.

The Eagle 1650 provides a scan speed of 8.6 in./min at a resolution of 500 line/in.; 21.6 in./min at 200 line/in.; or 4.3 in./min at 1,000 line/in. The Eagle 1680 provides a scan speed of 3.1 in./min at a resolution of 800 line/in.; 10.3 in./min at 200 line/in.; or 1.6 in./min at 1,600 line/in.

The Eagle 1650 is priced at $45,000. The Eagle 1680 costs $50,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127. 303-973-6722.

A color scanner and separating system for producing color separated film negatives and positives to expose lithographic and letterpress printing plates has been announced by **Howtek, Inc.**

The **Colorscan system** incorporates the vendor's Scanmaster digital color flatbed scanner; Scanmaster 35 digital color 35mm film scanner; Pixelmaster solid ink jet color printer; color processing computer and software and color algorithm. Photographs and line art are converted into 256 levels of gray data for each color. A high-resolution monitor allows the user to preview a scanned image.

Colorscan an be interfaced to a variety of 1,000 dot/in. film recorder and phototypesetters. It costs $96,000 including a film recorder; $85,000 without.

Howtek, 21 Park Ave., Hudson, N.H. 03051. 603-882-5200.

On October 23, 1987
IBM announced the new IBM
Personal Publishing System.

So you can create anything from
newsletters to presentation booklets with
the IBM Personal System/2®
right at your desktop.

Now your business can
really make headlines.

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On October 31, 1987
it was announced that an IBM Fellow
had received the prestigious Turing Award
for fundamental contributions to the
development of RISC technology.

Four months earlier, The Institute of
Electronics and Electrical Engineers (IEEE)
honored IBM for its innovation in both
inventing and developing the concept of
magnetic disk storage for computers.

All of which made 1987 a very rewarding year.

IBM

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Voice, finger and retina scans: Can biometrics secure your shop?

BY JANET FIDERIO

The systems programmer enters the small vestibule of the research lab. The door locks behind her, and the door in front of her will not open until an automated security system verifies her identity. She places her right index finger on the shining platen of a 10- by 12-in. box.

The scanner compares the ridges and bifurcations of her print with those on the employee's identification template stored in a host CPU. The chances are one in a million that another person's print will share the same characteristics. Confirmation is made, and the door swings open.

The employee goes to her desk and once again places her finger in a small portable scanner attached to her personal computer. Upon authorization, an audit trail is begun, and she can proceed with her work.

.....

Biometric security devices are the Rolls-Royces of the security industry. These products authenticate a person's identity by digitally measuring a physical or behavioral characteristic, such as a fingerprint, voice inflection or the pattern of blood vessels that snake across the retina.

They are heavy artillery in a data security arsenal, often welcomed by security professionals behind the scenes but frequently rejected by MIS managers on the front line.

"In effect, MIS managers work like hell to keep the systems user-friendly," says Jack Bologna, president of Computer Protection Systems, Inc. in Plymouth, Mich. "And when someone from security comes along saying, 'We're going to add this new access method,' everything MIS has worked for in the past two years is up in the air again."

But biometric systems are now being developed that are transparent to the user. Even those that add a step to the authentication process should not be discounted, especially by organizations that place a premium on corporate information.

What a properly installed and maintained biometric device promises MIS is an almost fail-safe method of verifying the identity of the person accessing the corporate facility or data. "Once this is done, we are in the position of having real accountability in our records," says Charles Cresson Wood, president of Information Integrity, a San Francisco-based security consulting firm.

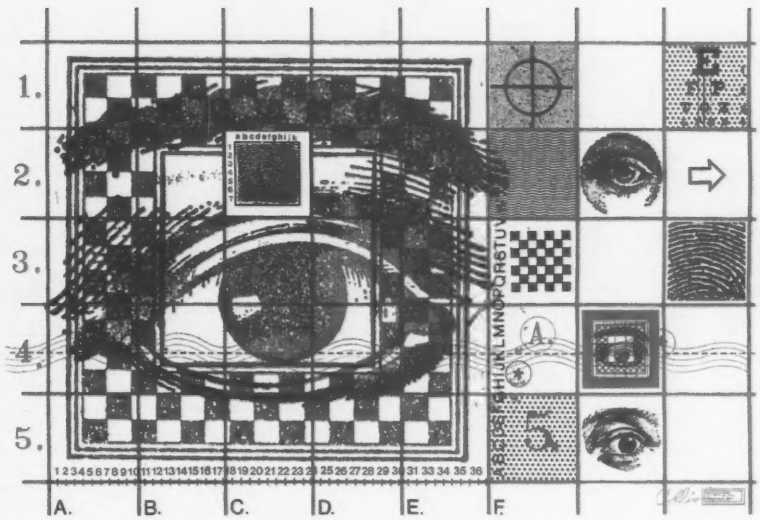
While biometric devices cannot ensure that an authorized person entering the building or sitting at the terminal is not about to commit a crime, the products promise thorough audit trails based on a rigorous authentication scheme.

A person's identity can be verified according to one of three parameters: what he knows (passwords), what he has (smart cards or tokens) or what he is (biometrics). Of the three, biometrics is the most exact: It is easier to tell a friend your password or to lose your token passcode generator than to duplicate your fingerprint.

Biometric products come in a variety of shapes, sizes and prices. At the high end, off-the-shelf devices like a retina scan can cost as much as $7,000 for the hardware alone. The least expensive signature and keystroke dynamic systems cost between $400 and $700.

Six biometric technologies are currently available. Retina scans use a low-intensity light source to scan a circular section of the retina. The eye signature created is stored in a microprocessor. Traditionally used for physical entry systems, retina scanning systems are also available for data access applications.

Thumbprint or fingerprint identification systems create



DAN COLLINS

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Fiderio is a *Computerworld* senior editor, features.

Biometrics

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templates of a fingerprint by measuring and digitizing the ridges, loops and bifurcations unique to an individual's print. These are typically found in either physical or data access control systems.

Hand geometry systems measure, record and compare finger length, skin translucency, hand thickness or palm shape. Typically, they are used for physical access systems.

Voice verification devices make use of voice patterns and inflections to make a unique template. Most of these systems can accommodate minor voice deviations. They are typically used for physical security.

Signature verification devices commonly use sensitive pens or pads to trace either the static or dynamic characteristics of a person's signature. They have been designed for both physical and data access tools.

Keystroke dynamics identify individuals by their typing patterns and rhythms. These products commonly monitor various repetitive character groups such as "i-n-g," "t-i-o-n" and "t-h-e." Log-on-only and continuous verification systems are being developed. Keystroke dynamics are typically used for terminal or PC data access control.

All of these biometric products compare the stored templates with fresh patterns or scans to allow or deny access to the mechanism being secured, whether it is a building or a terminal. They are tools used only in large security control systems. Many of the data access products can interface with products such as IBM's RACF.

Biometric products are most often found in the U.S. Department of Defense and other government facilities, European and Middle Eastern defense organizations, research labs and even computer tape storage centers. Most of these applications are for physical access security systems, but custom data access systems have been in use for years.

Industry sales of biometric devices almost doubled last year (see story page 84), and more than 17 vendors currently market products. An additional 15 companies are beta-testing biometric devices.

Are they for you?

But can commercial companies — and your MIS group — use biometrics now? It depends on your environment and what you are trying to protect. Even though these devices are expensive, cost may be insignificant when corporate data is extremely sensitive or valuable (see story at right).

KEYSTROKE dynamics "has value, and we've used it. But you must make sure you employ the technology in the right applications."

JOAN MURRAY REYNOLDS
CHEMICAL BANK

According to one user in the financial services field who has tested several biometric devices, 3% to 5% of all corporate data requires top-level security.

"And this percentage may change depending on the environment you're in," he says. "In a firm that does genetic engineering, for instance, maybe 95% of its information is in that [top-secret] category; but at General Motors, maybe only 3% of all that company's information is in the category."

There is data in commercial environments that is worth securing at any cost — for instance, seismic research in a major oil company, product development in any competitive corporation, sensitive or dangerous research applications or funds transfer systems. Loss, theft or compromised data in any of these situations could be considered a crushing blow.

Not surprisingly, custom biometric data access systems are already in use at top high-security environments in both commercial and government facilities. And an increasing number of Fortune 500 companies — such as General Electric Co., Merrill Lynch & Co. and Manufacturers Hanover Trust Co. — are testing them.

Vendors of biometrics, however, no longer target just the high-end security market. While these companies still court national security and government sites, they now see MIS departments of large corporations as potential clients. Not only do vendors think many corporations could benefit from their physical access systems — where the majority of biometric systems are currently found — but they see untapped potential in the MIS and data access control market.

Prices coming down

To meet the needs of this sizable market, vendors are developing less expensive, more portable offerings that have drastically reduced average prices of low-end products. For example, a number of products last year broke the $1,000-per-unit barrier. The first commercial biometric device to do so was a signature verification unit called Sign-On, developed by Signify, Inc. in Columbia, Md.

According to Signify President Peter Kelly, Sign-On is in production. One way it can be used is as a system or network access control device designed to protect companies from unauthorized penetration from remote sites over dial-ups or leased lines. The hardware costs less than $700.

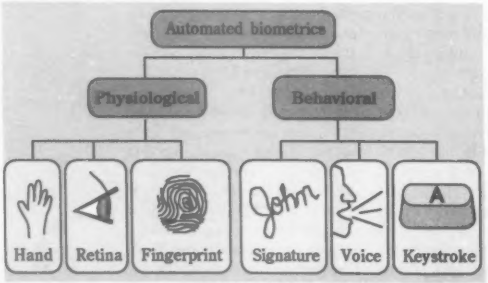
Another firm about to break the $1,000 mark is Thumbscan, Inc. in Oak Park Terrace, Ill. Its basic fingerprint verification product, due out this month, will cost $995. According to company President Peter Dignan, the product is targeted "almost exclusively to Fortune 1,000, highly integrated, multiple-CPU environments."

Perhaps the least expensive of the biometric devices soon to be available are typing or keystroke dynamic systems. International Bioaccess Systems Corp., based in New York, is beta-testing a product called Biopassword. It consists of host software and a printed-circuit

Continued on page 86

High-tech security

Automated biometric devices use either physiological or behavioral characteristics to identify an individual



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CW CHART: AMY J. SWANSON

Planning, consulting boost biometric bill

BY BARBARA SEHR

Putting a price tag on security, whether it's a smoke alarm in a child's bedroom or a biometric device to protect valuable company data, is a difficult challenge for most people.

But imagine, if you will, an MIS department at a huge cosmetics corporation. Beyond the walls of its computer room stands a cluster of mainframes and minicomputers.

Within the huge data base is an exclusive formula that will reshape the faces of American women. The details of the mixture are known only to the chief executive officer and a small, highly valued group of researchers.

Every competitor in the cosmetics business would like to get its hands on this formula. How do you ensure that the few employees authorized to work on the formula are the only ones that can access it? And how much will a security system cost you?

Administrative details

If you intend to use biometric devices as your primary means of security, you can count on some hefty start-up costs. According to Charles Cresson Wood, who operates Information Integrity, a security consulting firm in San Francisco, the main expenditure for a system done right usually comes from administrative costs.

During consultations with clients, Wood stresses the importance of answering such administrative questions as: "Who should have access?" "What is the purpose and level of each person's access?" And, "How do you manage changes within a job?"

A typical biometric security installation at a large corporation can amount to about $100,000 in in-house costs, Wood says. These costs include planning for the system, using in-house people as trainers for other employees and administering security controls such as keeping up with the employment and security status of all those who enter or exit a protected site.

This price does not include consulting fees, which could run as high as $50,000, and still excludes any equipment that is purchased or installed.

Also note that equipment costs would not be limited to specific biometric devices. Use of a biometric product is likely to require a dedicated personal computer. This is the case unless the device can be integrated into a company's mainframe network, which might also handle building maintenance functions such as climate control. For some facilities, however, a dedicated PC is recommended.

Sehr is a free-lance writer based in Seattle.

Pricey hardware

From this point, hardware choices begin to get expensive. Don Grant, vice-president of Entrance Controls, Inc. in Seattle, says the average biometric device can cost about $8,000 per door, including normal installation.

Grant, who has installed security systems at installations as varied as software developer Microsoft Corp. and the Strategic Defense Initiative research project at Seattle-based Boeing Aerospace Co., says the cost for a biometric installation is about four times that of a typical card-key entry system.

IF YOU intend to use biometric devices as your primary means of security, you can count on some hefty start-up costs.

According to Ben Miller, a security consultant and publisher of "Personal Identification News," a newsletter based in Washington, D.C., the cost depends on what kind of input device is used in the installation. The most common device is a hand geometry unit, which measures the shape of a user's hand against a data base of various imprints.

Miller says hand geometry units — which tend to be the most reliable — cost less than $3,500 uninstalled. This compares with about $6,500 without installation for a retina scan unit from Eyedentify, Inc. in Beaverton, Ore., which represents a more recent technology.

Also commonly used, Miller says, is a thumbprint reader, which can cost $5,000 per unit uninstalled.

To secure a simple computer room with a single access door, one of these devices is likely to be sufficient. However, some users combine devices such as card keys and biometric units for maximum peace of mind.

The ultimate trap

Miller notes that one of the most elaborate security systems is something appropriately called a

mantrap. In the mantrap, users must first enter one door of a specially built room using a card key, then provide a thumbprint and finally enter a password to gain access to a second door that provides entry to the secured area. In the case of unauthorized entry, the intruder is held within the room until security personnel arrive.

Depending on the extent of construction required, installation alone for such a device could cost a company several hundreds of thousands of dollars, according to Miller.

> "COMPANIES suffer a greater loss through errors of omission than commission. Things like human error have caused more damage than fraud."
>
> CHARLES CRESSON WOOD
> INFORMATION INTEGRITY

In most biometric device setups, cost of installation is usually included in the purchase price, according to Entrance Controls' Grant.

However, if installations require extensive, atypical wiring, price is likely to go up accordingly. "If an engineer gets involved, it can run an additional $50 an hour," Grant says.

Password problems

Even though you may have controlled access to the computer room, security measures are not yet complete. The terminal itself needs protection from unauthorized use, and that may require additional biometric devices. Password protection is simply not enough for a top-secret scenario.

The problem with passwords, consultant Wood says, lies not in the elaborate systems themselves but in the user. "The real potential of password systems has not been recognized," he says. "Errors arise in the manner in which the passwords are determined and in the failure to maintain constant revisions."

As a result, real security will demand additional protection. That protection may amount to yet another hand geometry unit that requires a user to identify himself each time he begins work at a terminal.

It's all in the stroke

A less expensive biometric alternative that also restricts access to a terminal is a keystroke dynamics system from International Bioaccess Systems Corp. in New York.

According to Frederick L. Saxe, International Bioaccess's CEO, keystroke dynamics measures the way a user types on the terminal keyboard in 110 different tests.

Individual patterns are stored by the system, and access can be gained only by repeating the stored pattern. The entire system is contained within a single printed-circuit board that can sell for about $500 in low volumes.

Personnel requirements

Once biometric equipment is installed, it requires some user training. There are two types of users: the security administrator and the authorized user.

Security administrators are usually assigned the task of establishing enrollment in the system.

They are also responsible for maintaining security provisions — making sure, for instance, that privileges are granted and revoked in keeping with employee turnover.

These administrators obviously require more training and, therefore, must spend more of their time in the training process.

On the other hand, depending on the complexity of the device chosen, authorized users may require only a couple of hours' or days' training.

The cost of this training, like installation, is usually included in the price of the overall project. Employee man-hours spent in training are figured into Wood's $100,000 in-house costs estimate.

Given the huge costs, Wood says, elaborate security systems may not always be worth their upkeep to every company.

"Companies suffer a greater loss through errors of omission than commission," he says. "Things like human error have caused more damage than fraud." •

The world according to biometrics

A glossary of security terms

Biometric
A generic term denoting a physical trait determined at birth that remains relatively unchanged during adult life unless altered by major cosmetic surgery or injury; examples include fingerprints, profile and color of eyes

Enrollment
Enlistment of sample biometric data for a reference source for future verification attempts; often, many samples are taken and an average archived

Enrollment time
The time period required for an identifyee to record the data that will be used as the identity reference

False accept
An error, as a result of malfunction of the verification method, whereby an identifyee is determined to be someone who he is not; also known as a Type II error

False reject
An error in verification whereby a genuine identifyee is designated as an imposter and not permitted access; also known as a Type I error

False accept/false reject ratio
A method of rating an automated verification system; for consumer systems, the rating should be very high, which means an occasional imposter will be allowed access and that authorized users will most likely not be refused admission

Fingerprint pattern
Any of a number of fingerprint characteristics, such as ridge endings and bifurcations (divided branches of ridges), are analyzed, quantified and used to create a unique personal identifier

Hand geometry
Any of a number of hand characteristics, such as the silhouette of the closed hand, finger length and hand proportions, are analyzed, quantified and used to create a unique personal identifier

Identification
Determining who a person is without prior indication by that person; this is most often done in law enforcement when the identifyee is either incapacitated or intentionally uncooperative

PIN
A unique personal identification number, often required by systems for further verification activity

Profile
A term frequently applied to the file data taken from enrollment; some systems update the profile each time it is used

Quasi-biometric
A shortened term (from quasi-biometric personal characteristic) for a trait that is in part biometric but in part cultivated and habitual in nature; for example, a golf stroke, a signature or a mode of walking

Retina scan
A method of collecting data describing the vascular pattern on the back of the retina that is analyzed, quantified and used to create a unique personal identifier

Session
A general term referring to the time during which the identifyee and the system are involved; usually, it is preceded by the terms "enrollment" or "ID," whichever is appropriate

Signature dynamics
A set of pen movement characteristics, discovered when a signature or other writing is performed, that are analyzed, quantified and used to create a unique personal identifier

Verification
The process of determining who a person is by first requiring a declaration as to who he or she claims to be, then proving the claim true or false; this is typical of a commercial situation in which the identifyee presents nonsecret information (a card or the keying in of an employee number) that is then verified by something such as a fingerprint or by visual recognition; the identifyee is almost always willing and cooperative

Voice pattern
Human voice features, such as nasal resonances, pitch and volume, that are analyzed, quantified and used to create a unique personal identifier

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Lower prices add to market rise

BY BEN MILLER

Commercial demand for biometric security devices has grown slowly since these products became widely available in 1985. But the market is definitely on the upswing.

Slightly more than 1,000 biometric verification devices were sold in 1987, nearly double the number from the year before. Dollar sales, however, dropped as a result of rapidly decreasing prices on the units.

The lower prices and broader range of products available this year should result in substantial growth in both unit and dollar sales. The majority of units placed will be integrated into applications such as access control for offices and military installations, information system security, criminal investigation systems, inmate and prisoner control and perhaps some civilian government programs.

The average cost of biometric verifiers sold in 1987 was less than $3,000, compared with nearly $7,000 in 1986. Prior to 1986, there were no devices that cost less than $7,500.

Two major factors contributing to these lower than average prices are the entry of products in the $495 to $3,500 price range and price cuts of up to 30% on the more expensive high-security devices.

Most of the less expensive devices are intended for integration into application systems developed by others; they do not include support electronics or hardened casings, both of which are required for biometrics' largest market to date — industrial security access control. In the future, end-user prices of biometric devices will become increasingly hard to track as the level of integration accelerates.

A new generation

A new generation of lower priced voice, signature and hand geometry devices began to emerge last year, accounting for more than 60% of the biometric units sold, or about 25% of the industry dollar sales. This year, the unit market for devices priced at less than $3,500 should rise to nearly 80%, and their dollar share of the market could approach 50%.

Biometric vendors also brought in approximately $7 million in development money from corporate partners and government funding. Another $22 million to $25 million was raised in public and private markets to support further development.

> FALLING prices are the result of new designs introduced by companies just entering the market.

The level of research and development expenditure for biometric projects in very large organizations such as IBM, NCR Corp., Siemens AG, NEC Corp. and AT&T is difficult to estimate, but many of these companies hold patent positions on devices not yet released.

The lower price trend will continue this year for both the new generation of devices and the high-security access control systems. By mid-year, as many as six reliable devices selling in the $400 to $1,500 range will be available.

Manufacturers are hopeful that the low prices of these devices, intended for integration into other systems or as OEM equipment, will stimulate industry sales. If such sales do not materialize, it is certain that several vendors will not be around in their present form by year's end.

Price wars

Falling prices are the result of new designs introduced by companies just entering the market. Established developers respond by offering lower cost models on their own products and by lowering prices on existing models.

Vendors with lengthy industry experience, such as Identix, Inc., Eyedentify, Inc. and Fingermatrix, Inc., have announced lower cost and streamlined product versions. Most of these companies are taking extra time to make sure everything works right before they release new versions commercially.

Ecco Industries, Inc. is the only firm to date that has shipped products at both the high and low end.

In the upper end of the market, highly accurate, tough-to-spoof machines for industrial and military security will cost less than $5,000 on the average this year, compared with more than $7,000 in 1986 and about $6,000 last year. Already, Recognition Systems, Inc., whose ID-3D product gives false accept and reject rates of less than 1%, has begun to win support from distributors and the military. It is priced at around $3,500 per access point.

Fingerprint readers could get a boost if law enforcement agencies decide to equip their new automated fingerprint identification systems with live-print direct readers.

It is difficult to estimate what the biometric sales picture will look like later this year. Restricted federal budgets will not help the situation for high-end products, but the track record they have established for reliability and lowered prices may open the way for some sizable sales.

Sales of products in the less than $1,500 segment could grow exponentially if the initial units perform well in beta-test sites. To date, few of the units in this price range have been in service long enough to establish a reputation. If reports from initial users are good, some amount of pent-up demand could be released. •

Miller is publisher of "Personal Identification News," a Washington, D.C., newsletter that tracks advanced security technologies and policy.

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IBM The Bigger Picture

Biometrics

CONTINUED FROM PAGE 82

board that is inserted in a workstation.

Biopassword verifies an individual during the logon process by measuring 110 different variables — such as key pressure, typing rhythms, speed and trends in common letter groupings — as he keys in his ID and password.

The system, which is transparent to the PC or terminal user and provides programmable time-outs, is being beta-tested by Hughes Aircraft Co., Wells Fargo & Co. and Merrill Lynch. The hardware's total cost is $495.

According to Ben Miller, publisher of Washington, D.C.-based "Personal Identification News" ("PIN") newsletter, the average cost of a biometric device in 1986 was $6,900. Last year, the average cost was a little less than $3,000. Miller says prices should drop even further this year.

But even if the interest is there, prices are still too high to allow MIS environments to readily adopt biometric products, once they consider the large number they need for data access applications.

"We certainly have the need [for biometrics] today and have had for some time," says William Olischar, vice-president of information systems at Prudential Insurance Co. of America in Roseland, N.J. "The generic requirement is there [for biometrics] — and in quantity."

MIS Training Institute's Weiland

However, even though some products cost less than $1,000, shops like Olischar's need thousands of the devices, an expense that adds up. "We are watching [the technology], and there is going to be a point where it crosses that line. But we are not there yet, and we are probably a couple of years away," he adds.

According to Cheryl Helsing, president of Cheryl Helsing, Inc., a security consultancy in San Francisco, one of the problems with biometric devices is that they are difficult to cost-justify.

"If you eliminate a human guard," Helsing says, "you can figure on saving $50,000 on around-the-clock guard service. But data security applications become difficult to justify when you have a large number of terminals or PCs that need to have these devices added." It is at that point, Helsing says, that cost per device becomes a big issue.

Olischar adds that adopting biometrics is closely tied to economics and risk vs. cost. Steve Weiland, director of information security at The MIS Training Institute in Framingham, Mass., agrees. "The idea is not to spend more on the control than on the risk," Weiland says. "If you have the possibility of losing $1,000 a year, it doesn't make sense to spend $5,000 a year trying to prevent the $1,000 loss."

Other than cost, a major problem stifling commercial sales of biometric devices is that products are still evolving, and results of beta testing are, in some instances, still being incorporated into designs. This is especially true with biometric data access products.

"We are at the introduction stage of the life cycle," "PIN" 's Miller says. "Users need to understand what their requirements are and also what the frustrations of a new technology will be."

User annoyance

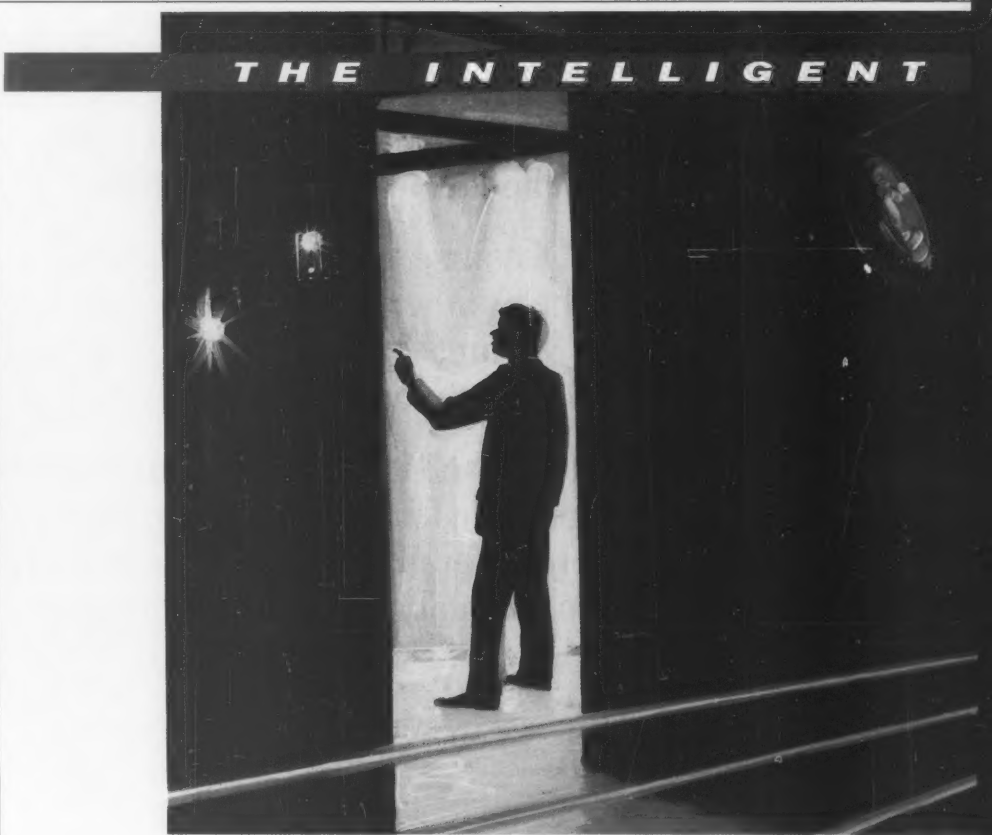
One of these frustrations is the user annoyance factor of these products. According to Computer Protection Systems' Bologna, the products can turn off users because they tend to err on the side of conservatism — that is, they can prevent an authorized person from accessing the system.

When an authorized person is denied access, it is called a Type I false negative error. A more serious problem, a Type II error, is a false positive, when an unauthorized person is allowed access. In facilities that need extremely high security, a higher than average Type I error rate may be condoned to ensure that the Type II error rate is top-notch.

The Type II error rate in Eyedentify's retina scan product, for example, is estimated to be one in one million. User companies can adjust the Type I and Type II values of the products to tighten or loosen security controls. But that process could annoy early users.

According to Joan Murray Reynolds, vice-president and corporate data security officer at Chemical Bank, false rejects were a problem when Chemical Bank, based in New York, tested a yet-to-be-released keystroke dynamics product.

The product, Reynolds says, constantly monitored the way a person at a terminal typed. If an authorized person did not type the same way all the time, he would get kicked off the system and be forced to log on again. Keystroke dynamics "has value," Reynolds says, "and we've used it. But you must make sure you employ the technology in the right applications." Reynolds recommends keystroke dynamics for organizations that do a great deal of data entry, in which computer operators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do the same thing repeatedly.

Another issue that must be addressed is public acceptance. A certain percent of the population may inherently distrust some types of biometric identification. As a result, not all types of that technology are suitable for all applications.

At a major national laboratory that has been using retina scanning devices for physical access authorization, user acceptance was a minor problem. According to one of the site's security specialists, who requested anonymity, a small group of users resisted the system initially because they did not understand the technology and feared that the scan would damage their eyes.

Likewise, some people associate fingerprinting with law enforcement. According to George Warfel, security consultant and "PIN" coeditor, about 4% to 5% of the population last year still resisted having their fingerprints taken.

Public acceptance can especially become a problem if a biometric device is to be used in a public service, such as automated teller machines. In these situations, signature dynamics or voice products would be best, since they request the card user to do something he is accustomed to doing. That is why, Information Integrity's Wood says, quasibiometric technologies such as keystroke dynamics have a lot of potential. These products are passive in nature and do not require user involvement and cooperation.

One last snag in the biometrics picture is the possibility that MIS will resist additional security. According to Bologna, some MIS professionals argue that biometric devices complicate the logon process further.

Even if you feel your facility needs high-tech security, be sure to set up a test environment and work with the products thoroughly before you sign on the dotted line. "Gain experience with the technology," Helsing says. "Do evaluations and pilot tests and get to know which application is best suited to your shop."

Wood recommends interested users to enter a 30-day, no-commitment trial before going ahead with a wider implementation. "To unilaterally decide that this technology should be applied across the board," Wood says, "is a great recipe for failure." •

A card holds the future

The first place MIS will most likely see biometric technology is embedded in token- or smart-card devices. According to Joan Murray Reynolds, vice-president and corporate data security officer at New York's Chemical Bank, the combination of smart or token cards and biometrics makes sense because it would cut down on certification and authentication costs.

"There are points that must be worked out so the systems can't be spoofed," Reynolds says. "But it appears now that this is the way [biometrics] would be most useful and least expensive to implement."

If biometric data were stored on a smart card, the information could be validated by a local reader instead of having to be transmitted to a CPU.

Verifying signatures

One example of a possible smart card and biometric scenario involves automated teller machines. In the near future, when you open a bank account and apply for an ATM card, the bank officer may not only ask you for your account number but also request that you enroll for a signature verification template. The biometric information would be digitally stored on the token or card.

When doing your banking at an ATM, you would at some point be asked to sign your deposit or withdrawal slip using a specially equipped pen and pad. In the time it took you to sign your name, the ATM's biometric reader would compare it with the information stored on the card.

Providing you had the necessary funds in your account and your signature was verified, your transaction would be processed. Similar systems could be used to verify credit card purchases.

Four choices

Four vendors that currently provide such products are Micro Card Technologies, Inc. in Dallas, Fingermatrix, Inc. in White Plains, N.Y., Identix, Inc. in Palo Alto, Calif., and Security Dynamics, Inc. in Cambridge, Mass.

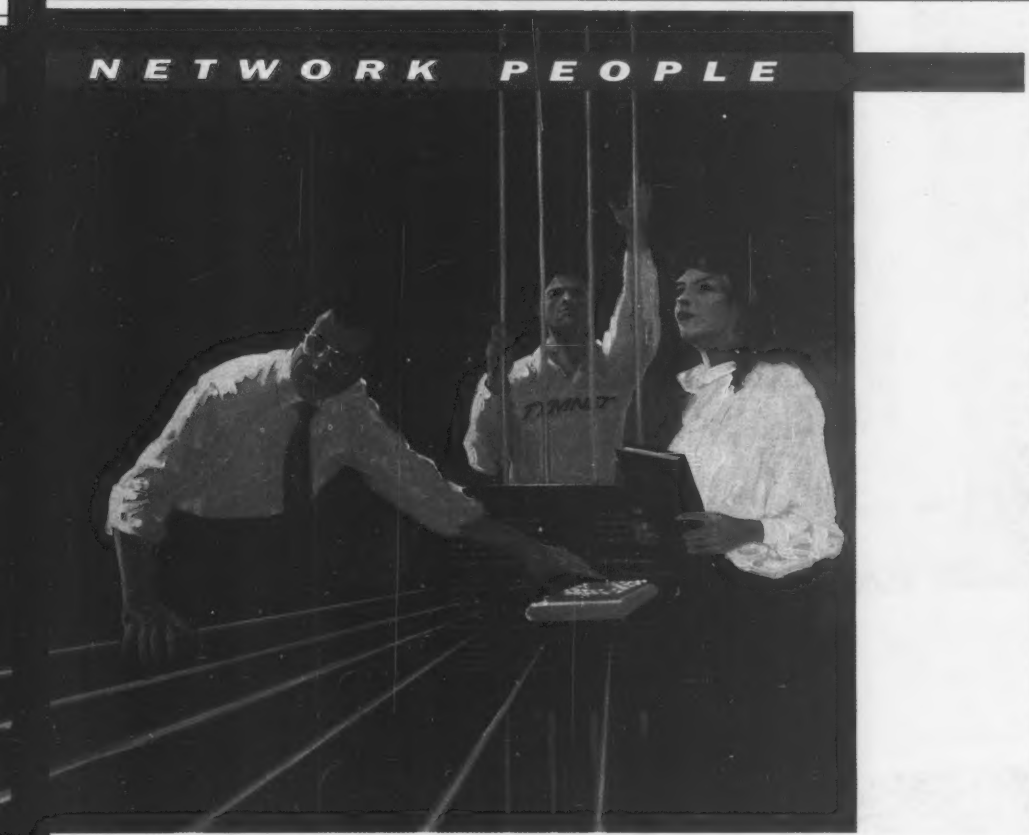
Micro Card Technologies' product, called Smartcard, is the size of a credit card and stores an employee's personal identification number (PIN) along with a biometric template if requested. All information is embedded in read-only memory and erasable programmable ROM.

The Fingermatrix Ridge Reader Mint smart card terminal provides users with a smart card that stores a fingerprint minutiae file. The product is scheduled for release in the spring.

Identix provides smart cards to be used with its IDX-50 and IDX-50W Smartcard Access Control terminals. The smart cards combine fingerprint templates, a PIN and an optional magnetic strip.

Security Dynamics' product, SecureID, is a random pass-code generator that contains a small micro system that stores all information in random-access memory. When the card is tampered with, connection between the battery and memory is broken. This destroys all information and makes the card tamper-resistant.

JANET FIDERIO



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Neural networks: Glamour and glitches

Neurocomputers shine in demonstrations but still make some decisions for the wrong reasons

BY MICKEY WILLIAMSON

While university scientists still try to figure out how the nervous system works, engineers and mathematicians in the private industry are building neural networks to solve problems that defy the capabilities of traditional serial machines.

So far, the only large-volume application for neural networks is in high-speed modems. But before long — maybe in less than two years — neural networks will be the tool of choice for analyzing the contents of large data bases.

Neural networks are already being tried out in a variety of applications:

- Modems that transfer data at 9.6K bit/sec. use a neural network that learns to distinguish between noise and data.
- Nestor, Inc. markets a system that reads handwriting and converts it into ASCII characters as though the information had been entered through a keyboard instead of a digitizing pad.
- Hecht-Nielsen Neurocomputer Corp. has a product that can recognize and classify complex visual images, a feature useful in applications such as industrial parts inspection and autonomous robotics.
- Both Neuralware, Inc. in Sewickley, Pa., and Neuronics, Inc. in Cambridge, Mass., offer low-cost software that lets developers experiment with neural network architectures. The former runs on Intel Corp. 80286 machines, the latter on the Apple Computer, Inc. Macintosh SE or Macintosh II.

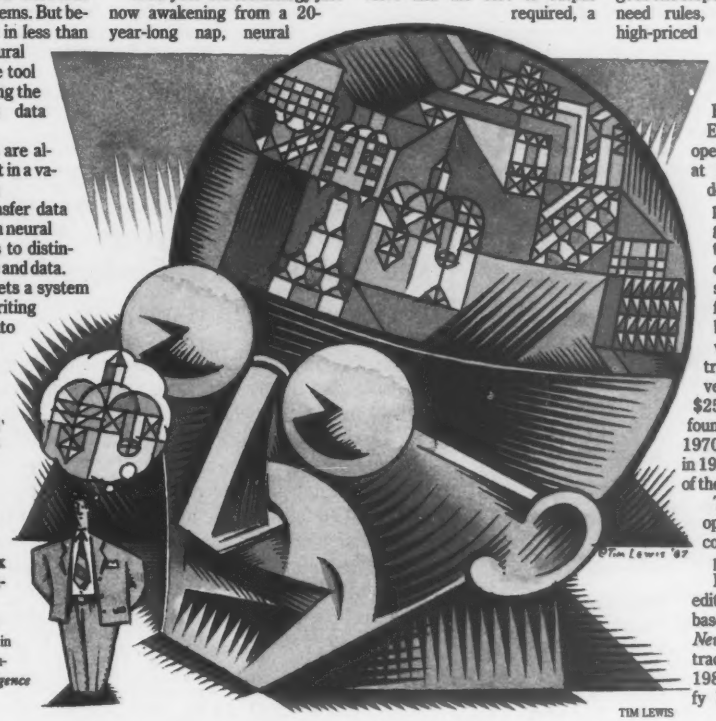
A 30-year-old technology just now awakening from a 20-year-long nap, neural networking offers an information processing approach entirely different from the conventional algorithmic programming model. Instead of following a painstakingly enumerated list of steps to achieve a program goal, neural networks — also called neurocomputers — are trained for a specific task in much the same way a human would be. That is, given a set of examples of the kinds of inputs it will receive and the sort of output required, a neurocomputer will develop its own problem-solving algorithm.

Since neurocomputers function essentially by recognizing patterns, they are well suited for tasks that conventional computers cannot do — for example, looking at masses of marketing and sales data to discern buying patterns for a product line.

This is the stuff expert systems are made of, but a neural network-based expert system goes one step further: It does not need rules, programming or high-priced knowledge-engineering services.

According to Barrett Moore, Eastern regional operations manager at Nestor in Providence, R.I., an application-level programmer can learn to build an adaptive expert system — a system that learns from the data it has been shown — with two weeks' training and an investment of about $25,000. Nestor, founded in the mid-1970s and incorporated in 1983, is the patriarch of the neural industry.

The rate of development in neurocomputing is impressive. When Edward Rosenfeld, editor of New York-based *Intelligence Newsletter*, started tracking the field in 1984, he could identify barely two dozen



TIM LEWIS

Williamson is a technical journalist and consultant in Warwick, Mass. She is author of *Artificial Intelligence for Microcomputers.*

- **Future application: Giant data bases**
- **Well suited to unconventional tasks**
- **One step beyond expert systems**

companies worldwide involved in neurocomputer work. He now lists more than 175, at least 125 of which are devoting "very major efforts" to neural networking development research.

"I count 29 or 30 start-ups in the field in the last two years," Rosenfeld says.

The pace has probably not yet reached its peak. Some 1,500 people attended the first International Neural Network Society conference in San Diego last June. More than 200 papers were presented, and a straw poll found that two-thirds of attendees were involved in product development.

One of the more spectacular demonstrations at the San Diego conference was Netalk, built by Terrence Sejnowski at Johns Hopkins University in Baltimore. Netalk was able to learn to translate ASCII text into understandable English speech.

At first, Sejnowski reported, the neurocomputer babbled like an infant. Gradually, it learned to distinguish between words. After about 16 hours of practice in matching text and phonemes (corresponding speech sounds), it was talking at the level of a 6-year-old child.

Caveat emptor

Today's buyers are investing in research and development, experts warn, not in a mature technology. Several years will have to pass before neurocomputers join mainstream computing.

According to Robert Hecht-Nielsen, founder and chairman of Hecht-Nielsen Neurocomputer in San Diego, designers still have much to learn about configuring and training neurocomputers.

But, Hecht-Nielsen says, designers do not face technical barriers comparable to those vexing researchers in superconductivity, for example.

Before he left TRW, Inc. in San Diego to start his own company, Hecht-Nielsen built what is probably the largest neurocomputer in existence today, the Mark IV, for the U.S. Department of Defense.

Neurocomputer architecture is modeled on current understanding of the way the human brain encodes and processes information. Nodes in a neural network — called processing elements — model individual nerve cells, or neurons, in the human nervous system.

In the brain, each neuron receives electrochemical impulses from thousands of other neurons. If the sum of the signals received is strong enough, the neuron sends it on to another nerve cell or to a muscle or organ.

Laboratory scientists are now trying to determine how the organic network of nerve cells is arranged and what happens within a neuron when learning takes place.

Just like a brain

Neural network simulation software lets developers work with some of the dozen or so best-known theories of brain organization and learning. They can experiment with processing elements and the strengths of signals between the elements.

Just as the field of expert systems has given rise to a variety of development tools and theories about which tools best match which kinds of problems, we can expect to see neural network development systems that employ one or another organizing principle for internode connection and learning.

The brain is a massively parallel processor, working on many inputs at once; neurocomputers are also inherently parallel. But most currently available products are software packages or add-in boards that simulate neural networks on conventional serial computers.

There is no guarantee that a good piece of neural software would run better on a parallel computer, Rosenfeld says.

The processors in a neural network, whether implemented in hardware or software, are relatively simple. Unlike traditional von Neumann computers, which rely on a central processor and do one thing at a time in serial fashion, neurocomputers work in parallel, with several processing elements at once handling a single data item.

The fact that processing, and hence learning, is distributed among processing elements leads to unusual robustness in neural networks. Neurocomputers are inherently fault tolerant; individual processing elements can malfunction without compromising the entire system, just as individual cells in the brain can die with no appreciable change in a person's behavior.

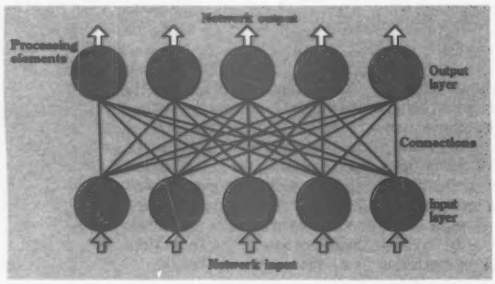
Typically, processing elements are arranged in layers, or slabs (see chart at left). The lowest layers look at general features of a pattern — curved or straight, thick or thin, high or low — and succeeding layers are increasingly specific until at last there is a slab whose output is sufficiently refined to be useful.

The lower levels may recognize, for example, that a character contains a couple of curves. Intermediate levels may refine their understanding of the shape, but only at the top layer is the input recognized for what it is, the letter S.

Neurocomputing finds its roots in technologies such as signal processing and pattern recognition. Its history dates back to the 1940s and a paper written by neurophysiologist Warren McCulloch and mathematician

How a neural net works

The processing elements are organized in layers in which each element has weighted connections to elements in other layers; the input layer receives many stimuli, while the output layer produces only one response



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I don't do numbers

According to one theory, logical and rational operations are performed by the brain's left hemisphere, integrative and intuitive functions on the right. Following this, neurocomputers are right-brained: no good at all for keeping the company books but very well suited for discerning the financial indicators in a year's worth of stock market data.

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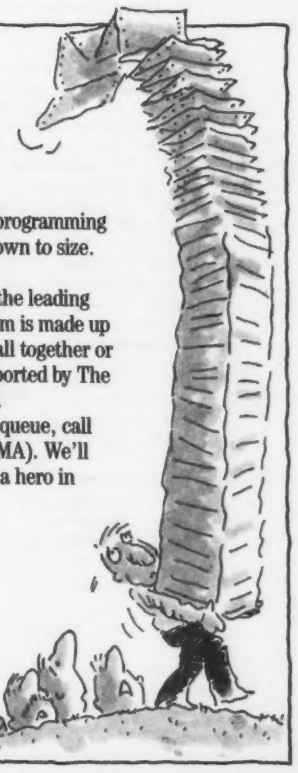

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Walter Pitts. The paper described an abstract model of neurons and showed how they might be connected to carry out mental processes such as learning.

Death, rebirth

This work caught the imagination of Harvard University undergraduate Marvin Minsky, who in 1951 built a learning machine out of vacuum tubes and motors based on the McCulloch-Pitts neuron model — a model that to this day forms the basis of most work in neural networking.

Minsky, now a professor at MIT, went on to become one of the founding fathers of artificial intelligence. Though much of his early work provided a foundation for present-day neurocomputer research and development, Minsky's 1969 book *Perceptrons* presented a scathing critique of neural networking.

The book is widely held to be the reason that funding for neural network research dried up in 1970, sending the technology into dormancy for nearly 20 years.

Today, interest and activity has reawakened, due in part to two trends in the chip making industry: low prices and high density. The price of memory and processors has decreased to the point that vendors can invent their own technology rather than wait for it to come from university research laboratories.

Howard Bogert, vice-president at Dataquest, Inc., a San Jose, Calif., market research company launching a multiclient study of opportunities in neurocomputing, sees the technology as a way to make use of advances in semiconductor technology.

EVENTUALLY, we will see neural networks on a chip.

With chips becoming ever more complex, Bogert predicts, by the year 2000, "it will be possible rather routinely to build a chip equivalent to 1,000 VAXs."

Given the current lack of knowledge about which network configurations best suit which kinds of tasks, simulating neural networks in software is the logical choice. But eventually, we will see neural networks on a chip.

The implications of neurocomputing in fields such as manufacturing and process control are many and varied. For example, AIware, Inc. in Cleveland demonstrated a neural simulation of paper-tension control in a paper mill at the San Diego conference. The system performs a quality-control function, determining how strong and thick the paper will be.

Dataquest's Bogert says he sees neural networks as potentially good quality assurance inspectors in combination with a vision system. They should, he says, spot both "gross defects and generalities such as 'Is the label on straight?' "

Neural networks could also handle data base management tasks such as eliminating duplications from a mailing list. A neural network "should be able to recognize that H. Jones is the same person as Howard Jones if the address is the same," Bogert says.

Teaching an expert system to do that would require a series of rules in which the system first distinguished between first and last names and then matched the last name and address in Record A with those in Record B. It should then discard one of the two records if the last name and address are identical in both. A neural network would simply match patterns contained in the two records and discard one if the match exceeded a given threshold — for example, if there was an 85% correspondence.

Calling on the expert

One of the most interesting product categories is adaptive expert systems. Nestor has one such system installed for beta-testing in a financial services firm, where it makes recommendations concerning mortgage applications.

According to Nestor spokesman Barry Hoglund, the system receives application information from the company's historical data base and is told by keyboard entry whether each application was accepted or rejected and, when possible, whether the accepted applicant later defaulted on the loan.

"After a significant number of applications have been presented to the system, it will develop its own internal understanding of what constitutes an acceptable application or one that should be rejected," Hoglund says. "At that point, if you submit a new application, it will make a decision whether to approve or deny [the loan]." The number of training cases varies with the application, but "it is numbered in the thousands, rather than the hundreds of thousands," Nestor's Moore says.

This system is different from a conventional expert system of the inductive variety — in which rules are developed from a set of examples — Hoglund says, because "we don't predetermine what the relationships are between the variables. We submit the variables to the system and let it recognize a pattern."

The potential problem is that the neural system may pick out bogus variables on which to base its conclusion.

Suppose, for example, an insurance underwriter bases decisions on factors that do not appear on the application. Perhaps the company has a temporary policy in effect to restrict loans. Maybe the applicant has an unusual history with the company.

In those cases, the neurocomputer would probably find some variable on which to differentiate, but its decisions would bear no resemblance to the human underwriter's performance.

Or, consider an inspection system that is shown a set of good ballpoint pens and a set of rejects. It happens that what is wrong with the rejects is that the ink outlet is clogged. But the

Make it look familiar

As with all new technologies, marketplace acceptance is apt to be slow in coming, with most potential customers taking a wait-and-see attitude. That stance is forcing vendors to be more creative in their marketing strategies.

"One of the approaches we're taking," says Casey Klimasauskas, founder and president of Neuralware, Inc., "is not to go too far out in terms of applications and to package those applications in a way that looks familiar and feels familiar but adds capabilities that aren't available otherwise."

Embedding neural networks within familiar products is a strategy already in use, according to several industry observers. Edward Rosenfeld, editor of New York-based *Intelligence Newsletter*, says he knows of "some very prominent neural networking scientists" who developed a neural network algorithm under subcontract with a chip making company. The chip maker now uses the network in a semiconductor inspection system it sells to a third company.

"No one would ever know that neural networks were in any way involved in this situation," Rosenfeld says.

Robert Hecht-Nielsen, founder and chairman of Hecht-Nielsen Neurocomputer Corp., says he sees neural networks and conventional computers as complementing, rather than competing with, each other. His company foresees a growing use of the neurocomputer as a coprocessor controlled by a host digital computer.

"That will become more and more common," he says, predicting that 10 years from now, practically every computer will be partly a programmed computer and partly a neural computer.

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vision component of the neural network cannot see that, and there is no telling what it will base its opinion of quality on. How to account for these so-called exogenous variables is one of the conundrums facing researchers today.

Nor can neural expert systems explain their decisions the way more conventional rule-based systems can. A rule-based system could display the rules and variables that it used to reach its conclusion and even write a report that could be used in a letter to a rejected applicant. Neural systems cannot yet do that.

Sitting on the bottom line

However, the potential of neural expert systems is still impressive. One financial services organization's neural loan analysis system is said to outperform the company's human experts by 27% in terms of profitability.

Hecht-Nielsen says, "If you translate that into the scale of a business that is lending hundreds of millions of dollars a year, that can be an astounding difference at the bottom line. It can make a good company great."

The kind of neurocomputer-based systems that science fiction movies show — the ones that recognize people's voices or faces or palm prints before they unlock a door — are becoming possible, according to Casey Klimasauskas, founder and president of Neuralware, Inc. And neural-equipped watchman robots should be able to differentiate between animals and human intruders in a factory, to see fire or flood and to decide on appropriate actions to take.

In the office, continuous speech-recognition systems — speaker-independent and able to adjust for variations in accent — will make possible voice typewriters that take vocal dictation and turn out printed memos.

But not quite yet. First, a few barriers must fall, Klimasauskas says. Small problems can be solved on machines in the Intel Corp. 80286 and 80386 classes, but some problems involve such extensive amounts of data, or the patterns to be matched are so complex, that special-purpose hardware will have to be developed.

In addition, the equations that determine the strength of connections between processing elements are both "very tricky to select and very critical," Klimasauskas says. "That does not make for a sufficiently robust system that you'd want to deploy it in the field for inexperienced users who don't know what the results should be."

Developers must also choose appropriate learning paradigms from among the 13 that are currently known. Hecht-Nielsen's software offers a choice of five. Different paradigms will doubtless be best suited for different tasks, but much work remains to be done before the best matches are found.

And a slew of unanswered questions remains: How should the weights of various inputs be summed in a given neural element? How often, and by how much, should they be adjusted? How many layers are sufficient, and how many processing nodes?

How enterprising should the system be; in other words, how many times should it guess before it gives up? If it finds one good answer, should it continue to search for another? Once it has reached a conclusion, what should it do about contradictory evidence?

ONE FINANCIAL services organization's neural loan analysis system is said to outperform the company's human experts by 27% in terms of profitability.

Down the road, users may be able to buy neural network shells that incorporate answers to many of these questions. But at the moment, each system is proprietary and custom-written.

Better or just newer?

"A lot of research needs to be done on whether you can really get more processing power out of a neural system than you can out of a traditional system," says Robert Kuczewski, TRW staff engineer. According to Kuczewski, many people in the field still do not understand the full implications of using the neuron, rather than a CPU and memory, as the basic processing structure. Furthermore, he says, "There really haven't been any applications demonstrated to date that are clearly better than any other way of doing the same thing."

"That's wrong," Hecht-Nielsen says. "Our customers are people who know their business; they've been in it a long time, and they've tried everything they can get their hands on. Now they've tried neurocomputing, and it works a lot better."

User companies with neurocomputer applications under development are not making announcements, and the neural network vendors working with them are usually sworn to secrecy.

But the names whispered in confidence are the big ones in finance, banking and insurance, as well as auto making, entertainment, transportation and telecommunications.

And while it is too early to define a neural network industry, or even to measure the installed base of neurocomputing systems, it is not too soon to think about the implications of a computer that can do something much more like thinking than anything we have seen before. •

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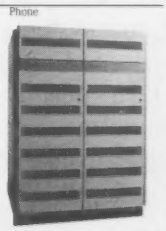

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Anita A. Bradley

Tending the DP forest

Do you rely on the phone to ring with complaints of poor response time or poor turnaround on batch work? Do your systems operators, network operators, systems programmers or application programmers have to worry about keeping your system running efficiently? Or do you have someone to monitor the performance of your shop and make corrections before small problems mushroom into large, unmanageable ones?

Data processing shops that don't have a group dedicated to this end aren't running as efficiently as they could. On one hand, if you have an abundance of cycles and storage available to do the job, your system will run smoothly, with little tuning required. However, your costs are likely to be higher than they need to be.

If, on the other hand, you maximize use of your current resources before acquiring more, you will need to pay more than a little attention to planning and performance management.

In short, while the operators, programmers and users are busy tending to the needs of their own little grove of trees, someone needs to watch out for the health of the forest.

At Virginia Power, one of the nation's largest electric utilities, the forest watchers are the technical services staff. They include some of our most versatile and experienced personnel.

Two of the employees in

Continued on page 104

Shaping up Goldman

Systems exec sees opportunity in market collapse

BY ALAN ALPER
CW STAFF

NEW YORK — It was the week of Black Monday when Rick Adam decided he would join Goldman, Sachs & Co. as a partner and the firm's top systems executive.

As the world's financial markets gyrated uncontrollably after almost five years of unbridled growth, it could easily be argued that this was not the most propitious time to come to Wall Street. Adam, moreover, already had a secure job: He was corporate vice-president of the information systems division at Baxter Healthcare Corp., a $5 billion Deerfield, Ill., health care firm.

But to Adam, joining one of Wall Street's most prestigious firms — even as industrywide contraction began — was like playing in the big leagues. "I didn't find it troublesome at all," Adam says. "In hard times, strong firms get stronger. I look at this as an opportunity."

Challenge is not new to Adam, a 41-year-old West Point graduate and father of four. His pastimes include skiing, marathon running and an occasional triathlon, and he is given to spicing his language with military and sports analogies.

Earned his wings

Adam served in the U.S. Air Force from 1968 to 1973, working as a computer officer and data center manager on the Apollo space program.

He later joined IBM as a sales representative based in Los Angeles, then ran Litton Industries, Inc.'s corporate data center, FMC Corp.'s data processing operations and Baxter's Information Systems Division.

PROFILE
Rick Adam

Position: *Partner, Goldman, Sachs & Co.*
Mission: *To hasten transition to IBM mainframes, seek technological edge over competitors.*

Upon his arrival at Baxter in 1980, Adam says, he found an MIS department wracked with problems. He conducted exit interviews with departing staffers to help formulate a remedy and found that much of the MIS staff had become stale.

Turnover down

To fix the systems shortcomings, Adam had to install personnel and human resource programs. He established Baxter's first college recruitment and entry-level training programs. Turnover fell from 25% to 3%, and the department's staff grew from 150 to 400.

Adam says his management style is rooted in military training and an acknowledgement that the Information Systems Division exists for one reason — to serve its clients. "I'm enormously mission-oriented," he says. "It's important for any [information systems] department

Continued on page 96

RECRUITING 1988

Cost control dominates in new MIS hiring season

BY LAWRENCE STEVENS
SPECIAL TO CW

At Sun Company, Inc., a Radnor, Pa.-based oil company, information systems units will do slightly less hiring this year than they did in 1987, delaying the replacement of employees and using more outside contractors.

"The price of oil has dropped in the past year, and that has pulled our profits down. And the further south our profits fall, the tighter we have to pull in our belt," says Dudley Cooke, general manager of information systems at Sun.

The oil company's situation is typical of MIS organizations in many industries at the onset of the recruiting season.

Most hiring needs for this year will remain steady or drop slightly from 1987, according to MIS recruitment specialists. They say this will prompt some managers to rely on more efficient recruiting techniques.

Win a few, lose a few

A few MIS departments will expand this year due to the addition of services or increased business volume, the experts add. But on the other hand, cutbacks will be evident in financial services firms overwhelmed by the Oct. 19 stock market collapse.

"The situation on Wall Street has definitely impacted the brokerage community and a limited number of investment banks in terms of the hiring of DP professionals," says Roger O'Connor, staff consultant at Edward Perlin Associates, Inc., a New York-based compensation management firm.

"There will be reductions of staff as well as bonuses, and there will also be salary adjustments," O'Conner adds.

HAL MAYFORTH

In general, however, most MIS hiring will be limited to the replacement of departing employees, and according to a telephone survey by Perlin Associates, turnover will remain steady or decline from the 18% to 21% rates of the last five years.

Despite anticipation of this belt tightening, there is no crisis atmosphere. For most departments, services will not be cut, expansion plans made last year will not be significantly altered, and outside of financial services, there will be few layoffs.

"It's just a question of be-

Continued on page 100

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THE FIRST CHOICE.

Shaping up

CONTINUED FROM PAGE 95

to get its mission well defined so folks know what it is and are focused on it."

As a Wall Street outsider, Adam's current challenge is to learn the vagaries and vernacular of investment banking. Planning systems and communications strategies while managing a large MIS staff and budget is not much different in investment banking than in other businesses, Adam suggests. Once the terms are translated, that is.

"I often have to take an interpreter along to catch some of the nuances of financial terms," Adam admits, referring to some of his meetings with Goldman's other partners and end users.

Intimate industry knowledge is only one element of being an effective investment banking chief information officer, Adam contends. Equally important, he declares, is broad technical knowledge, deft planning and organizational ability and good people skills. "You have to be like a good quarterback reading the defense," he says. "A CIO has to have good sensitivity to his clients."

Gene Bedell, director of information services at First Boston Corp. — to whom Adam reported while data center operations manager at FMC — believes the affable but stern executive will be able to adapt to the peculiarities of Wall Street.

"He's effective; he's got a good sense of people and a lot of common sense," Bedell says. "He's got a reasonably good technological background, but he's not a techie."

> "YOU HAVE to be like a good quarterback reading the defense."
>
> RICK ADAM
> GOLDMAN, SACHS & CO.

Adam is joining Goldman at a crucial time: A project to convert its corporate information system from old Burroughs Corp. to IBM mainframes is at least two years behind schedule and substantially over budget.

Wall Street sources say the protracted project contributed in part to the dismissal of Goldman's former top MIS executive, Abe Weiss. Regulatory changes and phenomenal growth at the firm helped bog down the project.

Bedell says Adam has not underestimated the challenge. "If anyone can do it, Rick can do it," he declares.

Seconding that opinion is Steven Lazarus, Adam's former boss at Baxter and now associate dean of the University of Chicago School of Business and president and chief executive officer of the Arch Development Corp, associated with the University of Chicago and the Argonne National Laboratories. "Rick's a learning system," Lazarus says. "He absorbs each experience and uses it."

Lazarus recalls a payroll system under development at Baxter that Adam was told to implement within a year of his arrival. Four months later, Adam told Lazarus the system would have to be junked.

"He said that if I let him start all over that in six months he could get a working system," Lazarus remarks. "It took a lot of courage, but that's what he did. And he did accomplish it."

High-octane exec

Goldman is hoping Adam can pull similar feats amid its pressure-cooker atmosphere. David George, the Goldman partner responsible for Adam's hiring, acknowledges the firm needed a high-caliber information systems executive to ensure that its technological infrastructure is as solid or better than those of its Wall Street brethren. Hiring Adam as a partner — something rarely offered to an outsider — reflects Goldman's serious commitment to achieving this.

"We found what we thought was the right person, and we offered what we felt was appropriate to Rick's accomplishments and what was required to entice him to the firm," George explains.

Soon after joining Goldman, Adam fired a recently appointed head of telecommunications, citing organizational overlap. Colleagues say Adam is good at sizing up talent and is not afraid to make changes if required. "Once he has the team he wants he'll fight like hell for it," Lazarus states.

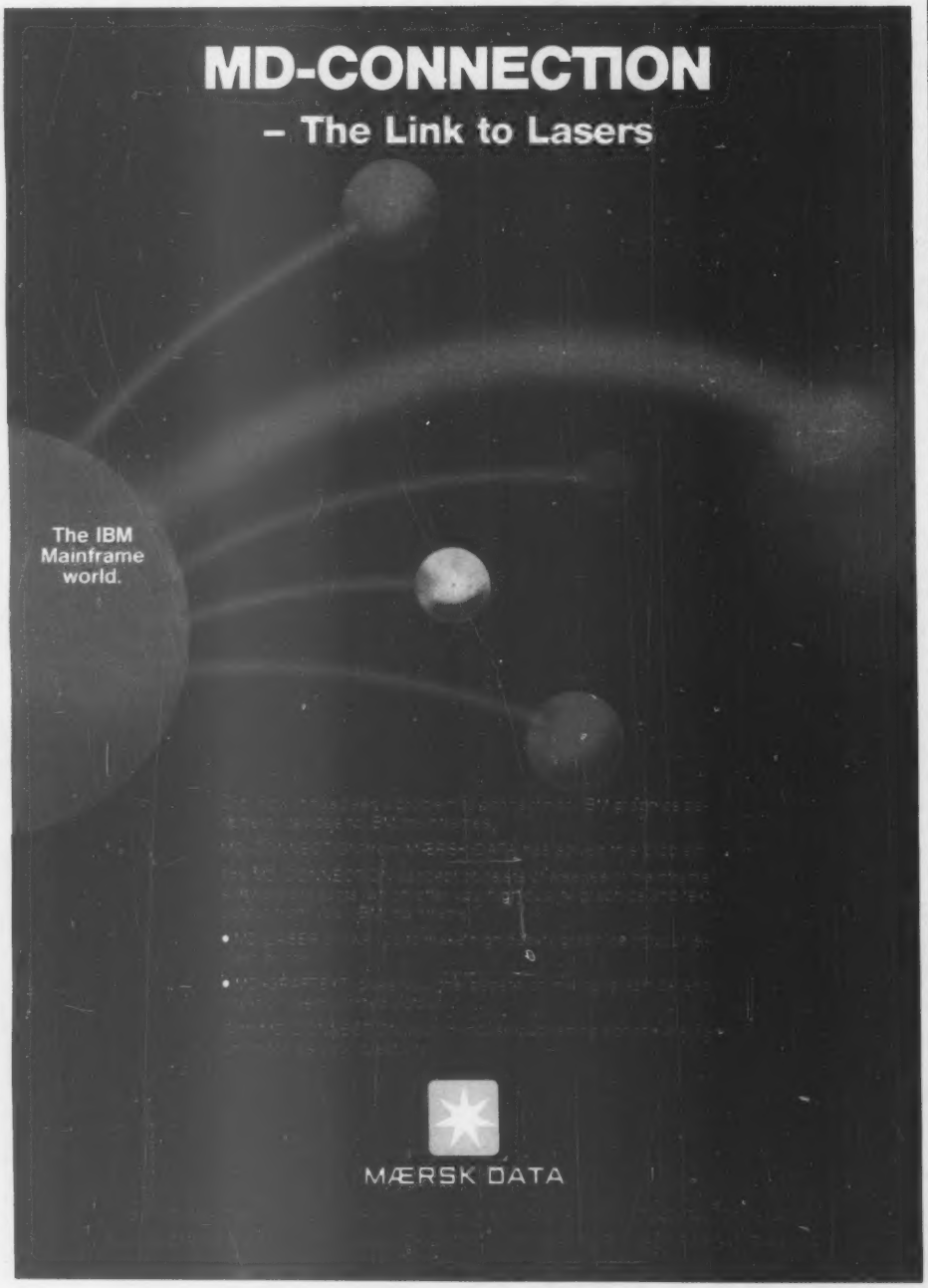
Adam realizes that having better technology than other investment bankers will enable Goldman to earn more money for clients and, ultimately, for the firm. That's why he hired management consultants to assess Goldman's level of automation through technology benchmarks designed to rate competitive advantage in the financial services industry.

"David [George] and I were looking for different ways to establish a starting point" for rating Goldman's technological infrastructure, Adam explains.

Starting points are something MIS projects and triathlons have in common. End points, however, are given greater weight in both pursuits. As a short-course triathlete, Adam knows that stamina is crucial to completing MIS projects and athletic competitions.

So far, Adam says his wind has been better in MIS-related tasks than in the almost 35 miles of swimming, bicycling and running that is required to finish a short-course triathlon. Adam believes he will improve in both areas with age.

"I plan on being the [triathlon] age-group winner when I get to 70," he says emphatically.



CALENDAR

FEB. 21-27

Supercomputing Europe '89. Utrecht, the Netherlands, Feb. 21-23 — Contact: Royal Netherlands Industries Fair, Postbus 8500-3503 RM Utrecht, the Netherlands.

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The Fifth Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 22-24 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics New York. New York. Feb. 22-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance for Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121

Super Graphic Workstations. Monterey, Calif., Feb. 23-25 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

1988 ACM Computer Science Conference. Atlanta, Feb. 23-26 — Contact: Association for Computing Machinery, Conference Dept., 11 W. 42nd St., New York, N.Y. 10036.

Interactive Instruction Delivery/Learning Technology in the Health Care Sciences. Kissimmee, Fla., Feb. 24-26 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

FEB. 28-MARCH 5

Telecom '88 Bank Telecommunications Conference. Bal Harbour, Fla., Feb. 28-March 2 — Contact Ed Alwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036

Third International Conference on CD ROM. Seattle, March 1-3 — Contact: Sherrie Eastman, Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

MARCH 6-12

National Conference of the North American Honeywell Users. Norfolk, Va., March 6-10 — Contact: Les Pacca, NAHU, P.O. 2037, Willingboro, N.J.

Integrated Database Management System User Association Annual Conference (IDMS 88). Orlando, Fla., March 6-10 — Contact: Kathleen Nilles, IDMS User Association, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSE) '88. Washington, D.C., March 7-10 — Contact: Debbie Murray, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

1988 Spring National Design Engineering Show and Conference. Chicago, March 7-10 — Contact: SNDES, 999 Summer St., Stamford, Conn. 06905.

Ninth Annual Conference on EDP Performance/Capacity Management. Scottsdale, Ariz., Mar. 7-11 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Seybold Seminars '88. San Francisco, March 7-11 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

EDI Here and Now. Atlanta, March 8-9 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

CAP '88 West. Los Angeles, March 8-10 — Contact: Computer Aided Publishing, Inc., Suite 200, 90 W. Montgomery Avenue, Rockville, Md.

Connect '88. New York, March 8-10 — Contact: Meg Meurer Young, Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

Society for Information Management Institutional Member Conference — Information Systems: The New Business Partner. Tarpon Springs, Fla., March 9-11 — Contact: Kathleen Nilles, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601

MARCH 13-19

1988 International Development Center Institute Conference. Orlando, Fla., March 13-16 — Contact: Development Center Institute, P.O. Box 44087, Indianapolis, Ind. 46244.

6th Annual National Conference on Ada Technology. Washington, D.C., March 14-17 — Contact: U.S. Army Communications-Electronics Command, ATTN: AMSEL-RD-LC-ASST-1A (Al Rodriguez), Fort Monmouth, N.J. 07703.

Securicom 88 — The 6th Worldwide Congress on Computer and Communications Security and Protection. Paris, March 15-17 — Contact: Securicom, 8 Rue de la Michodiere, 75002 Paris, France.

Desktop Presentations: Computers Reach for New Media. San Jose, Calif., March 16-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

Continued on page 104

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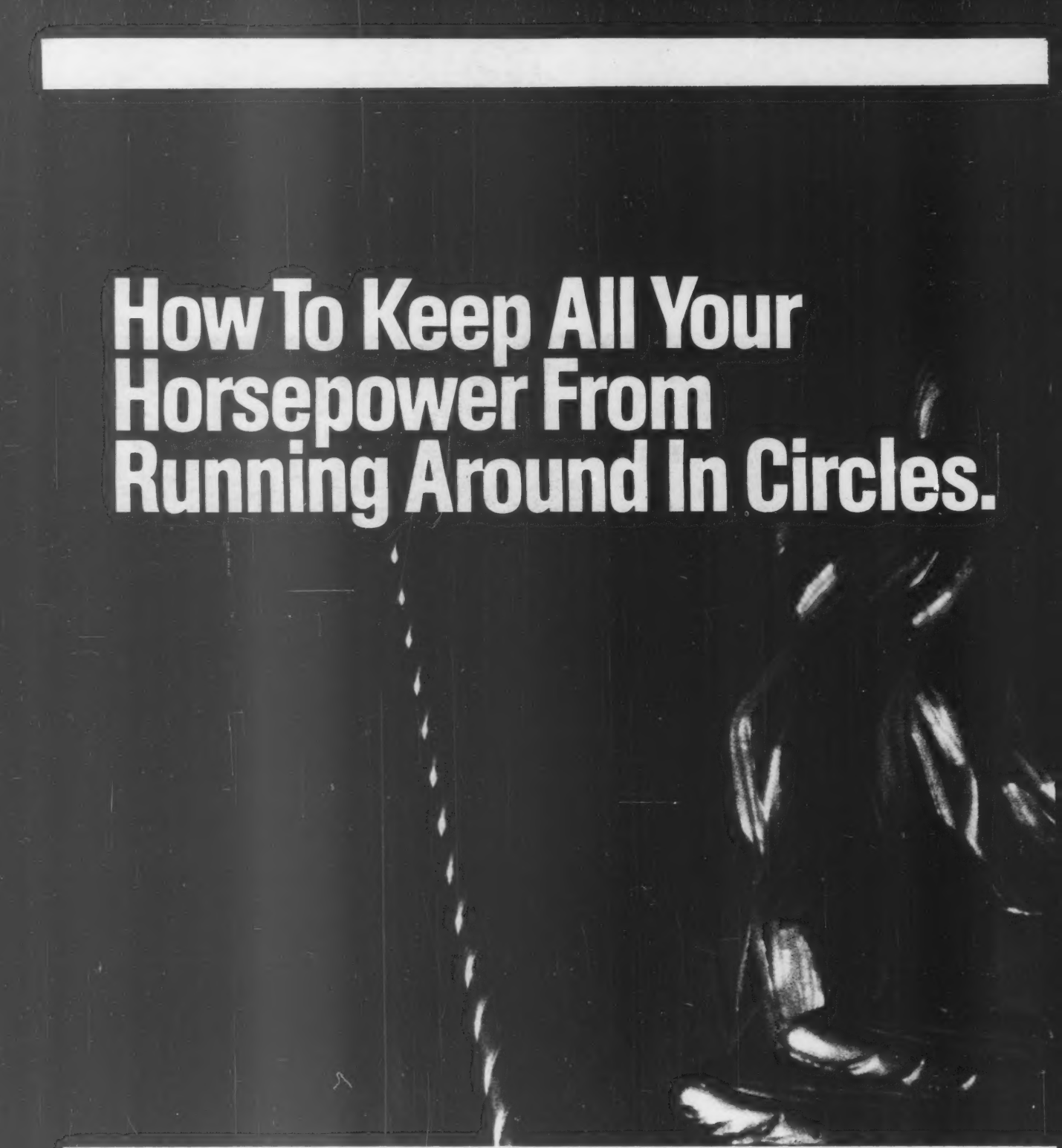

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Hiring

FROM PAGE 95

ing a little smarter and more efficient in our hiring and personnel practices," Cooke says.

Turning to contractors

One such practice is the use of contract workers. "MIS departments work on long-term plans," Cooke points out. "You can't drastically change the number of employees as business cycles ebb and flow. When we have to cut back, it shows itself in subtle ways. We hire at lower levels, we delay replacing people, and we use more outside contractors and temporary help."

Indeed, while staff hiring is expected to remain brisk in telecommunications, data base software and technical support specialties — jobs that are difficult to fill at any time — many companies are turning to contractors to fulfill these specialty needs.

Tom Ferruggia, manager of MIS at Aerospatiale Helicopter Corp. in Grand Prairie, Texas, is struggling to maintain services at a high level and convert from a home-grown DL/1 environment to a Cullinet Software, Inc. IDMS/R integrated data base environment while keeping the number of employees level.

He, too, will depend some on outside contractors. "Independent contractors cost more, but they give us the flexibility we need," Ferruggia says. He points out that using temporary expertise gives Aerospatiale the skills it needs at the time and in the areas that it needs them. "For the right situation, it's very efficient," he says.

Sun Company's Cooke

Innovative hiring tactics

Another way MIS can maintain services without increasing the personnel budget is to make use of more efficient recruitment techniques. Most managers cite this order of preference for hiring tactics: referrals from present employees; college recruitment (for entry-level positions); newspaper ads — first local, then national; and finally, professional recruiting firms.

Employee referrals. Fidelity Information Services Co., the data processing arm of Fidelity Investments, Inc. in Boston, has institutionalized the process of encouraging employees to refer prospective recruits.

Michael Simmons, the company's president, says offering employees $1,000 for successful referrals brings considerable savings compared with other recruitment methods (see story above).

College recruitment, lower level hiring. Many companies will also try to cut costs by hiring at lower levels. They will be looking at college placement offices for inexperienced recruits, who will need training. This method gets mixed reviews from MIS managers; the advantages include getting an employee relatively cheaply who can be trained in desired fields. A disadvantage is the high turnover as these recruits take their training and experience to another company.

Michael Heschel, vice-president of information resources at Baxter Healthcare Corp. in Deerfield, Ill., believes wholeheartedly in this method.

"We plan to do heavy campus recruiting, and we will hold at least two training classes this year," he says.

"We do expect to lose about 50% of the people we get that way within three or four years. But many of the people in our core of committed employees came from these training programs. These are the people who have grown up with us and are likely to stay with us."

Baxter's Heschel

Newspaper ads. Most MIS managers advertise in newspapers for their positions. Typically, they run half the ads in local papers and half in national papers. It is clearly an economical choice.

Aerospatiale's Ferruggia says he will try to hire through newspaper ads before going to a recruiting firm. "It's a lot more cost-effective," he says, "and we can usually find as good a candidate as those brought in by the recruiters."

Professional recruiters. Last on the list of methods for hiring come professional recruiters. This is partly because of the expense, which in a sense is like keeping one nonproductive person on the payroll for a year for every four or five people hired. A second problem is the question of the honesty and integrity of the recruiter, Fidelity's Simmons says.

He says that when he uses professional recruiters — normally as a last resort — he only uses the best. "The shadier headhunters will put people into your company and then ask them for names of other employees, whom they then try to move out of the company," Simmons says. "They take out from the top and bring in through the bottom." Whenever possible, he insists on a contract stating that the firm will not recruit out of his company.

Stevens is a free-lance writer based in Springfield, Mass.

What's hot?

Some of the technical specialties and products today's MIS directors seek in job candidates

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- DBMS[2] experts
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[1] Computer-aided design and manufacturing
[2] Data base management system
[3] Computer-aided software engineering

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CW CHART: FRANK C. O'CONNELL

Going the extra mile for a Mercedes

One innovative method some MIS departments use to recruit employees is letting current staff members refer potential job candidates to the company.

Four years ago, Fidelity Information Services Co. in Boston began a program dubbed Employee Pursuit that awards prizes to workers who recommend someone who is eventually hired by the company.

"Recruiting through newspaper ads or professional recruiters is expensive. We'd rather give part of the money we would have spent on those methods to our employees," says Michael Simmons, the company's president.

Simmons adds that the prospective recruits obtained through internal referrals are more likely to be hired; also, once hired, they tend to be more loyal to the company than employees obtained using other methods. Last year the firm totaled 780 referrals resulting in 180 hires, which represent about 35% of all recruits.

Despite the expensive prizes offered, including the chance to win a Mercedes-Benz, Fidelity Information Services normally has a substantial net savings when an employee is hired through a referral rather than other methods. Simmons points out that recruiting firms charge 20% or more of annual salary. At a $30,000 salary, the recruiter gets at least $6,000, while a typcial prize is worth about $1,000.

The number of companies that use this method of recruiting is still small, but the idea is slowly catching on. A similar plan at seven TRW, Inc. companies in California allows employees to earn $500 plus the chance to win a car for each recruit they bring to the company. The participating firms are fulfilling from 25% to 30% of hiring needs in this way.

McDonnell Douglas Corp. in Long Beach, Calif., also initiated a program in which employees earn $750 and the chance to win a vacation for each recruit they bring to the firm who stays for more than 90 days.

The company considers the program a success, but according to Doug Tillotson, a human resource director at Douglas, the firm is only going to implement the program every few years to prevent employees from spending more time recruiting than working.

LARRY STEVENS

LOCAL HAPPENINGS

NORTHEAST

Baltimore, Feb. 23. Association for Systems Management (ASM), Baltimore Chapter. Critical Long-Term DP Issues, with Dorine C. Andrews of Performance Resources, Inc. Marriott Hunt Valley Inn. Contact: Eileen Souza, 1904 Brightwood Court, Eldersburg, Md. 21784.

New York, March 9. Association for Women in Computing, New York Chapter. Health in the Office, with Milna Bulova of The Bulova Technique. Manufacturers Hanover Trust Co., 270 Park Ave. 5:30 p.m. Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y. 10163.

East Hanover, N.J., March 9. ASM, Western New Jersey Chapter. Designing, Implementing and Managing Information Centers, with Joan Fenwick of AT&T. Hanover Manor, 16 Eagle Rock Ave. 5:30 p.m. Contact: Lee Cahill, Cahill Associates, Inc., 305 Boulevard, Pompton Plains, N.J. 07444.

Philadelphia, March 9. ASM, Philadelphia/Keystone Chapter. Local-Area Networks: Future Direction, with Mason Brockwood of D.H. Brown Associates. Engineers' Club, 1317 Spruce St. 5:30 p.m. Contact: Jack Cavanaugh, Computer Task Group, Suite 1350, 8 Penn Center, Philadelphia, Pa. 19103.

SOUTHEAST

Charlotte, N.C., Feb. 25. Data Processing Management Association (DPMA), Charlotte Chapter. Monthly meeting. Royce Hotel, Interstate 77 and Tyvola. 6 p.m. Contact: David Hollifield, Piedmont Natural Gas, P.O. Box 33068, Charlotte, N.C. 28233.

Chamblee, Ga., March 8. ASM, Atlanta Chapter. Quality Assurance, with Pam Cowger of National Data Corp. The Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. 5:30 p.m. Contact: Jane Roberts, HBO & Co., Suite 1000, 1 Ravinia Drive, Atlanta, Ga. 30346.

MIDWEST

Cleveland, Feb. 24. DPMA, Greater Cleveland Chapter. Aspects of Communication Skills, with Paul Martino of Keiffer, Martino and Associates. Hilton South Hotel, Rockside Road and Interstate 77. 6:30 p.m. Contact: DPMA, P.O. Box 6772, Cleveland, Ohio 44101.

Kansas City, Mo., March 8. ASM, Greater Kansas City Chapter. Telecommunications: Signaling System Seven. Hilton Plaza Inn, 45th & Main. 5:30 p.m. Contact: Bill Newton, Computer Task Group, Suite 370, 11020 King St., Overland Park, Kan. 66210.

WEST

San Francisco, March 2. Association for Women in Computing, Bay Area Chapter. Data Driven Design, with Mike Smith of Quality Systems. Stagecoach Restaurant, 44 Montgomery St. 5:30 p.m. Contact: AWC, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

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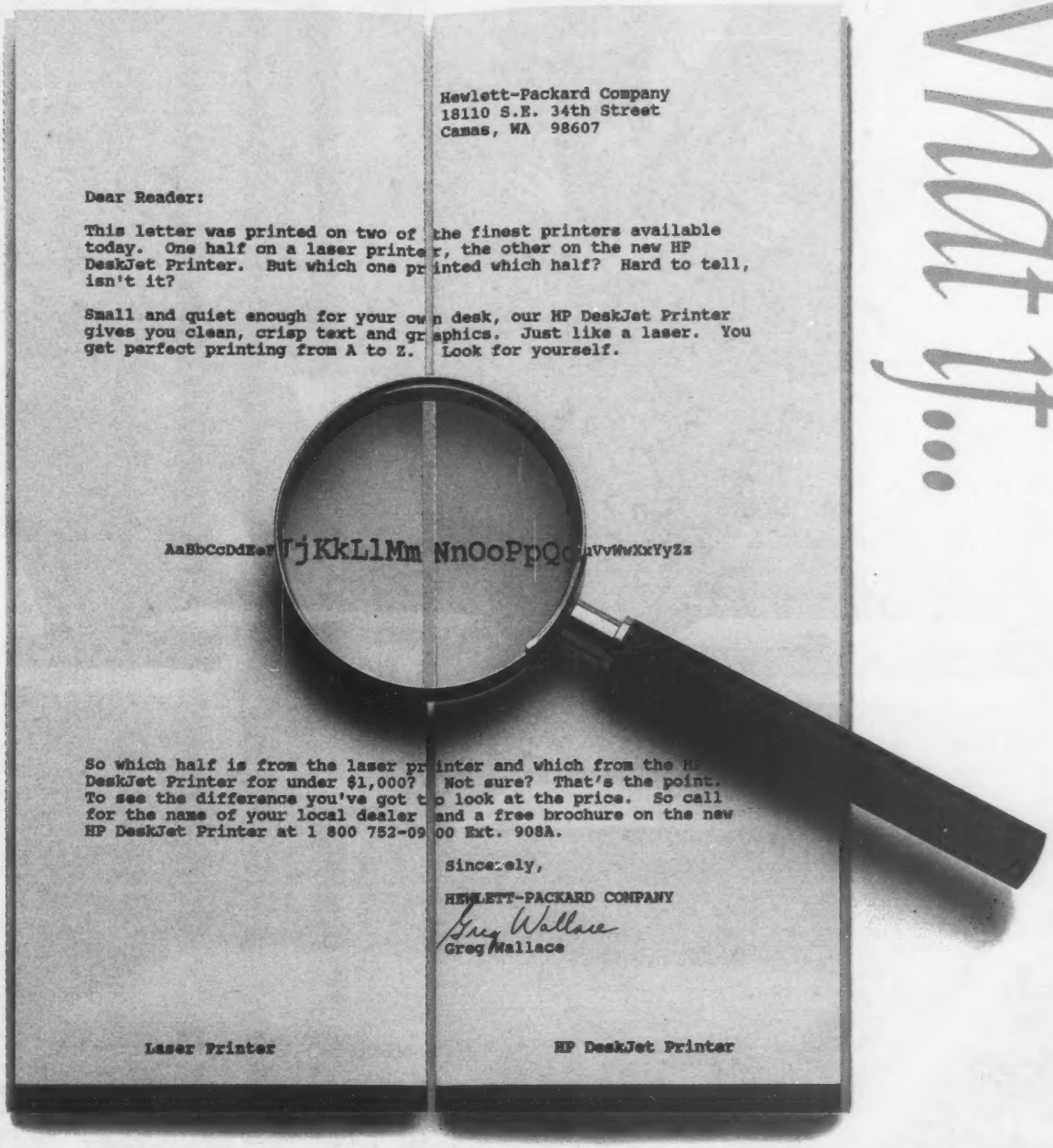
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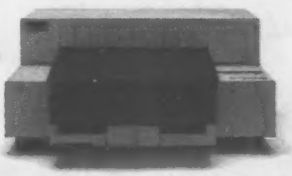

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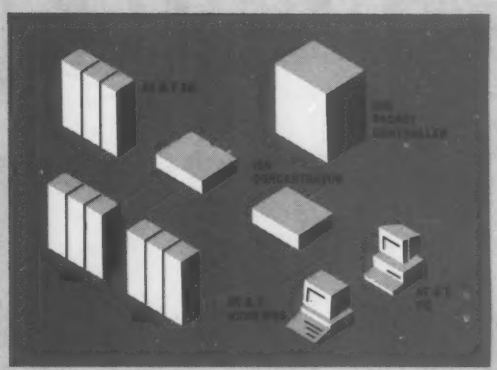

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The right choice.

Bradley

CONTINUED FROM PAGE 95

technical services are responsible for the performance and planning of the operating system, two for the network and distributed hardware, two for CICS and application design, one for direct-access storage devices (DASD) and tape and one for the procurement and disposition of hardware.

One big happy family

The group is a tightly knit, expert unit whose diversity and global perspective of the information systems world make it unique in our organization. Technical services is also the heart of the DP department's strategic and tactical planning effort.

Technical expertise teamed with a comprehensive understanding of the information systems function — that's what technical services is all about.

As a catalyst, technical services is responsible for working with all areas of MIS to solve problems. This arrangement works and works well. As troubleshooters, technical services staffers don't have daily responsibility for any one portion of the system. On the contrary, they have the freedom to inspect any and all parts of the system as needed. The group's activities include the following:

- Monitoring and tracking the system to predict when and where problems will occur and recommending corrective action to head off expected problems. This is achieved through both formal, quarterly performance and availability reports and informally through daily monitoring and tuning recommendations.
- Disseminating those findings to relevant sections of MIS through presentations, training, reports and newsletters.
- Conducting strategic and tactical planning for the computer system. This includes writing the DP five-year plan and other planning reports, such as the justification for a CPU upgrade or installation of a new software package.

All of these activities help the other sections of MIS perform more effectively.

In addition, technical services acts as a clearinghouse for information about application changes being installed on the computer system. This is helpful to system programmers and others who, because of the nature of their work, aren't always aware of the big picture.

By scanning the MIS environment and reviewing users' future resource needs, technical services can advise management on ways of "solving tomorrow's problems today," a slogan the group has adopted.

A couple of examples will illustrate my point.

Operations personnel once reported the runtime for a key batch job had increased by two hours. Both operations and applications personnel tried to solve the problem by changing the elements of the job they each understood.

Technical services took a different approach. The group analyzed the historical system records and pinpointed contention for DASD from a job in a different application. This job was scheduled to execute in the same time frame as the job in question. By scheduling these two jobs to run separately, both could execute in the same amount of time it used to take the longer job.

Cutting costs

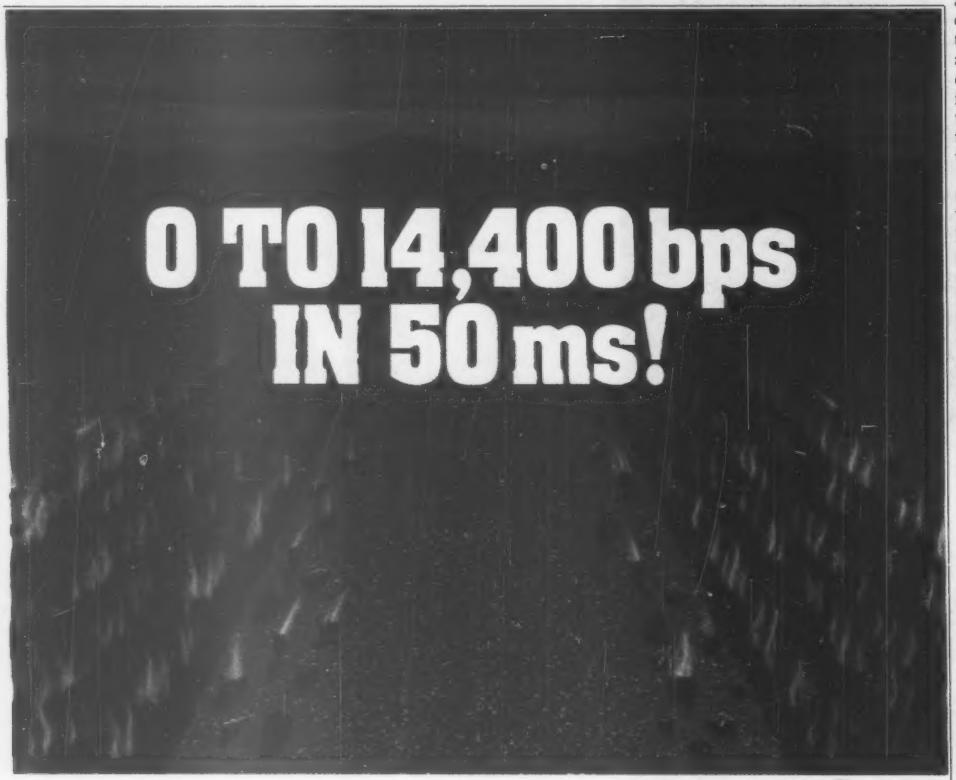
The technical services group has also helped cut the company's overall computer costs. In 1985, the group spearheaded a computer load management program that encouraged overnight use of the computer. This helped balance the work load and lower peak daytime utilization. As a result, prime time use dropped from 60% to 34% of the total. Computing costs declined from 44 cents per CPU second in 1985 to 22 cents in 1987. At the same time, computer utilization has continued to climb — more than doubling in the last three years.

In addition, on-line response time has consistently remained at less than two seconds for the remote end user, and the portion of batch jobs turned around in one hour or less has risen from 82% to 95%, while DASD utilization has risen from 50% to 67%.

The evidence is clear. Virginia Power's technical services group has boosted productivity and helped MIS maximize its resources.

In today's rapidly changing world, it helps to have someone grappling with tomorrow's problems — and presenting solutions today. What better way to stay one step ahead of the future?

Bradley is a systems information resources specialist in the Technical Services Section of Virginia Power's Data Processing Department.



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International Spectrum USA '88. Anaheim, Calif., March 29-31 — Contact: IDBMA, Inc., Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

Decus Rocky Mountain VAX Local Users Group Regional Conference. Denver, March 31-April 1 — Contact: RMVLUG, P.O. Box 13963, Denver, Colo. 80201.

Seventh Annual IEEE Phoenix Conference on Computers and Communications. Scottsdale, Ariz., March 16-18 — Contact: PCCC-88, P.O. Box 8950, Scottsdale, Ariz. 85252

Sixth National Conference on Measuring Data Processing Quality and Productivity. Scottsdale, Ariz., March 16-18 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

American Bankers Association's 1988 National Fiduciary & Security Operations Conference. New York, March 20-23 — Contact: Ed Alwood, 1120 Connecticut Ave. N.W., Washington, D.C. 20036

INDUSTRY INSIGHT

Clinton Wilder

Big doings at Compaq corral

So far, it's been a big year for high tech in Texas. First there was Austin's winning of the Sematech chip manufacturing consortium, and then, two weeks ago, the announcement that native Compaq's 1987 sales surpassed the $1 billion barrier in record time.

At first blush, it's a staggering thought that an IBM Personal Computer clone maker reached that milestone even before successful minicomputer builder Prime Computer. Prime came up just short, at $960 million for 1987, but, of course, it chewed through the billion-dollar barrier by gobbling up Computervision.

During its brief career, Compaq has vaulted into a very elite group. The 1987 Fortune 500 lists only nine U.S. billion-dollar commercial computer vendors, based on 1986 revenue.

That excludes billion-dollar firms that sell computers as part of their business, such as Tandy, Honeywell, Motorola, Zenith, Gould, Texas Instru-

Continued on page 110

Du Pont CASE unit hits the road

Chemicals giant melds technology, psychology to create custom software

BY NELL MARGOLIS
CW STAFF

WILMINGTON, Del. — Du Pont Information Engineering Associates (IEA) — the CASE consulting business unit launched by chemicals titan Du Pont Co. — is taking its show on the road.

A seemingly unlikely software player, Du Pont IEA is hitting the open market with a double shot of software creation aid. Du Pont IEA uses Application Factory, a powerful back-end computer-aided software engineering (CASE) tool developed by Waltham, Mass.-based Cortex Corp., and has an equally powerful conviction that MIS professionals and end users must be included in the software creation process from inception to completion.

In an industry niche ripe with products and overripe with hype — and in which would-be users are already complaining of too much choice and too little guidance — Du Pont is betting that the IEA approach will be not only believed but bought.

"We're projecting first-year revenues in the $10 million range," said general manager Scott Shultz, "but our infrastructure is set up for $20 million."

Still formally a Du Pont department, IEA last July received final clearance to operate autonomously within the company, complete with its own manage-

Du Pont's Shultz

ment and sales force as well as a staff of some 40 trained software developers.

Will IEA's mixture of team psychology and hard-core CASE play outside Du Pont, where the CASE consultants will not have the benefit of ongoing immersion in the customers' business? Early indications are that it will.

O. H. Materials Corp. in Findlay, Ohio, is among the first outside companies to build a system with the aid of IEA. Last spring, the 900-member hazardous and toxic waste cleanup company was in need of a work-in-progress tracking system.

The 15-person MIS department chose Application Factory as the tool most likely to build the system — only to realize that time spent learning how best to use Application Factory could substantially shave the efficiencies gained by using the tool in the first place. An Application Factory user at another company recommended a call to Du Pont IEA.

"It was kind of strange, calling Du Pont, of all people, for something like this," said MIS director Michael L. Turnow, who admitted doing a double-take when he first heard the name. The initial meeting with the team from IEA, however, convinced him that he had dialed the right number.

"There's no way we would have tackled a project this size, with a new tool like Factory, without IEA," said Dave Anderson, systems development supervisor at O. H. Materials.

The finished work-in-progress system, which went into production last month, "is by far the largest cost accounting system O. H. Materials has," Anderson said. It includes some 20 files, 30 screens and 50 different reports. "It took about three months to create, then six more to define and redefine what upper management really wanted to see."

Anderson said the project would have taken seven people a year to create without IEA, "instead of me and one person from DP working with IEA for nine months. We were working hard, sure, but I'm talking about two people instead of seven."

Continued on page 110

Hogan exec resigns; firm faces struggle

BY CLINTON WILDER
CW STAFF

DALLAS — Plagued by sluggish sales and declining profits, banking software house Hogan Systems, Inc. last week announced the departure of its No. 2 executive and the reorganization of its marketing and sales functions.

The company said President and Chief Operating Officer Richard B. Aldridge resigned to pursue other interests, but observers said his departure stemmed from disagreements with Chairman and Chief Executive Officer Gary W. Fiedler and Hogan's board of directors.

Fiedler took over the chairman's post last summer from George L. McTavish, who also resigned.

"Rick was very close to McTavish, so maybe McTavish's resignation was the writing on the wall," said Jim Poyner, a technology analyst at investment firm Rauscher Pierce Refsnes, Inc. "Hogan's not in fi-

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Inside

- Minisupercomputer vendors post mixed fourth-quarter results. Page 107.
- Unisys breaks into stock quotation business with Snapnet system. Page 108.

Data View

The best in software

Information systems executives at Fortune 500 companies pick top two vendors for software operations and products

Overall	IBM	DEC	Microsoft
	McCormack & Dodge	IBM	Lotus
Products	IBM	DEC	Lotus
	Cullinet	Tandem Computers	Microsoft
Support	IBM	DEC	Lotus
	McCormack & Dodge	IBM	Microsoft
Sales agents	IBM	IBM	IBM
	DEC	DEC	Lotus
Executives	John Imlay, Management Science America	None mentioned repeatedly	Bill Gates, Microsoft
	Mario Morino, Morino Associates	DEC executives in general	John Sculley, Apple

INFORMATION PROVIDED BY DONOHUE ASSOCIATES
CW CHART

New horizons for Northern Telecom

BY ELISABETH HORWITT
CW STAFF

MISSISSAUGA, Ontario — A recent management upheaval at Northern Telecom Ltd. heralds the telecom equipment vendor's accelerated drive into the overseas and end-user telecommunications equipment markets.

Earlier this month, the Canadian firm combined its overseas subsidiaries into one organization headed by Desmond Hudson, former president of domestic operations.

Hudson's successor, Roy Merrills, will be directing a reorganized Northern Telecom, Inc. toward a more dominant share of the U.S. customer-premise equipment (CPE) market, he said.

"I obviously have a mandate to grow our [CPE] business to match our success in switches," Merrills said.

His 1988 strategy for accomplishing this involves "very actively and intensively building customer relations" using the same basic open-door approach that the company brings to the central office switch market, he said.

Prior to his recent appointment, Merrills was group vice-president of Integrated Network Systems, Inc., Northern Telecom's central office switch group.

Full plate

"Roy has a lot on his plate now; the central office switch side is where the money has been for Northern Telecom," said Bart Stuck, vice-president of Probe Research, Inc. in Morristown, N.J.

The reorganization calls for Merrills to oversee all product groups, including the CPE areas such as data communications and private branch exchanges. In these areas, Northern Telecom's future success is based on "a wish, a hope and a prayer," Stuck said.

Merrills said one tactic that Northern Telecom plans to use is to have customers sit on advisory boards that will provide input into the company's planning for new products and services.

"I don't think it will be so different working with the Bell operating companies or with the Fortune 500," he said.

Uphill battle

Stuck disagreed. The CPE side of the market is "an uphill battle not suited to the technical sell," which Northern Telecom has used successfully to sell central office switches to the divest-

Continued on page 108

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Minisuper makers curb great expectations

BY JAMES DALY
CW STAFF

The soaring growth expectations of the minisupercomputer industry fell a little closer to earth recently when two leading players in the market tempered their healthy yearly financial gains with mixed fourth-quarter results.

Analysts noted that although the figures for Alliant Computer Systems Corp. and Convex Computer Corp. were good, future expectations have been trimmed because earlier forecasts were overly ambitious.

"Wall Street expectations for these companies a year ago had been off the wall," said Joseph Payne, an analyst with Baltimore-based Alex Brown & Sons, Inc.

"But we're still dealing with a very complex and new industry system," Payne added. "Both companies have super products whose features could become extremely important, especially in the scientific and engineering quarters. I'm looking for growth, but our expectations are coming down."

Alliant's restructuring fee

In the quarter ended Dec. 31, Alliant reported revenue of $14.2 million, a 15% increase from the $12.3 million recorded for the same period in 1986. Income, however, before extraordinary tax credits, was slammed by a one-time restructuring cost of $275,000 and dropped to $315,000, or 3 cents per share, from $1.1 million, or 13 cents per share, recorded a year earlier.

Yearly revenue for the Littleton, Mass., manufacturer jumped 75% to $53.8 million, compared with $30.8 million in 1986. Income from operations grew 51% to $3.6 million, or 34 cents per share, compared with $2.4 million, or 28 cents per share, for 1986.

Convex announced fourth-quarter revenue of $20.2 million, up 55% from the $13 million recorded in the year-earlier period. Net income before extraordinary credits for the Richardson, Texas-based firm grew 42% to $1.4 million, or 8 cents per share.

The company reported annual revenue of $69.6 million, a 73% increase over 1986 revenue of $40.2 million. Income from operations came in at $5.5 million, or 31 cents a share, compared with $2.2 million, or 15 cents per share, recorded for 1986.

Other vendors reporting financial results recently include the following:

VM Software, Inc. This system software developer concluded a difficult year in which profits dropped 32% from year-earlier levels while sales grew only 13%.

Fourth-quarter revenue of $11.5 million was up just 11% from $10.4 million a year earlier. Quarterly profits for the Reston, Va.-based firm were $2.3 million, or 37 cents per share, down 8% from the $2.5 million, or 39 cents per share, that was recorded for the same quarter in 1986.

Revenue for the year increased to $30.6 million from $27 million reported for 1986. Income dropped to $3.4 million, or 53 cents per share, compared with $5 million, or 77 cents per share, recorded a year earlier.

Electronic Data Systems Corp. For the quarter and the year, EDS posted solid profit gains on only nominal revenue growth.

Fourth-quarter revenue for the Dallas-based computer and communications services giant increased only 3% to $1.18 billion. But net income for the quarter rose to $104.2 million, or 85 cents per share, a 46% increase from the $71.5 million, or 58 cents per share, reported in the same period in 1986.

Annual revenue rose to $4.43 billion, up just more than 1% from the $4.37 billion recorded in 1986.

Net income rose 24% to $323.1 million, or $2.65 per share, from $260.9 million, or $2.13 per share, recorded a year earlier.

Hogan

CONTINUED FROM PAGE 105

nancial trouble, but its problem is marketing. They have to come to grips with how to sell their packages."

Hogan, closely watched by the mainframe software industry since its landmark 1986 OEM agreement with IBM, has seen its business marked by fits and starts since the initial boost from IBM. The 20-year agreement for IBM to become Hogan's exclusive U.S. sales channel for Hogan software restored the vendor to profitability and credibility, but Hogan has failed to sustain the momentum.

In Hogan's most recent quarter ended Dec. 31, income from operations fell to $1 million from $2.9 million a year earlier. More significantly, the slowed part of the business has been sales of new software products, while fees from maintaining current installations have contributed the only revenue growth.

"They're just coasting along at a stable level," Rauscher Pierce's Poyner said. "The IBM deal is proceeding much slower than they had hoped. And IBM is bending over backward to push applications software, which is all the more reason to wonder what's going on."

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XCI

Unisys enters retail brokerage stock quote market

BY ALAN ALPER
CW STAFF

NEW YORK — Unisys Corp. last week entered the increasingly competitive stock quote information service business, unveiling a hardware and software system aimed at small to medium-size retail brokerage houses.

The system, called Snapnet, provides stock quote information, account management data and local applications processing on a Unisys desktop micro.

Unveiled at the Securities Industry Association's Information Management Conference here, Snapnet was developed during the last three years in conjunction with Intelligent Quotation Systems, Inc., a small New York software developer. Snapnet will be marketed through Unisys's Financial Systems division.

The stock quote information business has become increasingly congested during the last few years as new vendors attempt to wrest market share from industry leader Quotron Systems, Inc. Quotron is facing reticence from brokerage houses that perceive its parent, Citicorp, as a competitor. Citicorp acquired Quotron in 1986.

Automatic Data Processing, Inc. has emerged as the primary competitor to Quotron, but its joint development contracts with leading brokerages Merrill Lynch & Co. and Shearson Lehman Hutton, Inc. have made other brokerage houses wary.

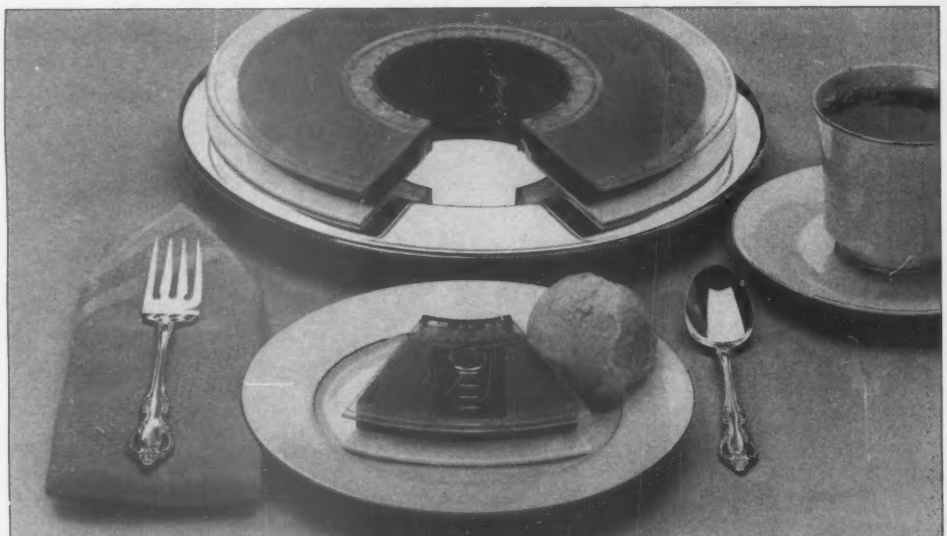
Ro Pavlick, Snapnet marketing manager, said despite market congestion, brokerage houses are looking for ways to customize their systems to provide competitive advantage. "Systems marketed by other vendors have provided limited interaction between customer account and market quote information," she said.

Unisys says that despite its late start, it can capture significant market share by starting with small brokerage firms and working its way up. "We're finding that because most of the hardware has been leased, brokers are not locked into any one vendor," noted Fred Pennino, eastern regional sales manager within Unisys's Financial Systems division.

Snapnet consists of a Unix-based computer that acts as a branch controller, enabling micros based on Microsoft Corp.'s MS-DOS to access a variety of stock quote data bases and other market information services.

The controller supports up to 20 workstations and facilitates access to account information on an IBM mainframe via a Systems Network Architecture bridge. Branch controllers can also be networked via the CCITT X.25 protocol.

Snapnet's controller is priced at $100,000, while the micros list for about $4,500 apiece, Pennino said. Cost of the market feed, software and services depend on the requirement of each installation, he added. Snapnet will be generally available in April.



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New horizons

CONTINUED FROM PAGE 105

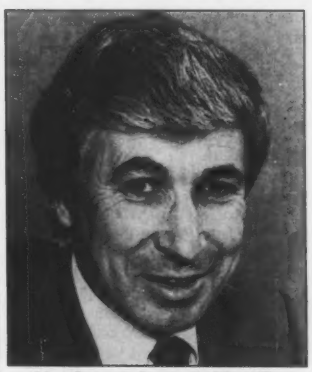
ed Bell operating companies, he said.

"CPE is much more complicated — for one thing, there's IBM. And it takes a more application- and marketing-oriented sell," he said.

CPE experience

Merrills does claim experience on the CPE side. Before his five years with Northern Telecom's central office switch group, he ran Northern Telecom Canada's international voice/data PBX terminal operations.

"I also helped develop the business during its formative years, so product-



Northern Telecom's Merrills

wise, I am fairly educated," Merrills said.

In the next two years, Northern Telecom plans to introduce connectivity products that will build on its Supernode central office system, Merrills said. "We are very interested in providing connectivity between multiple local-area networks," he noted.

Michel Guite, vice-president and analyst at Salomon Brothers, Inc., said Northern Telecom needs to strengthen its presence in the voice/data — as opposed to just voice — arena, and in the T1 switch market.

Guite predicted that Northern Telecom will bring out its own T1 switch line, and "do more with voice/data integration and network management — but slowly."

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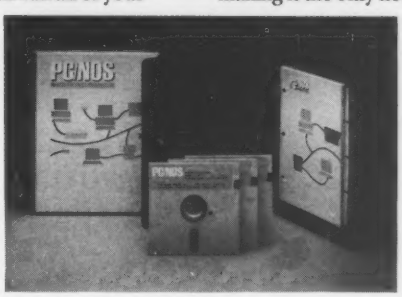

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Du Pont

CONTINUED FROM PAGE 105

Du Pont's proprietary project management methodology, Rapid Iterative Production Prototyping (RIPP), provides the customer with a tangible prototype early in the game before moving on to serial refinements.

"What users tell you they want isn't always what they really want," Shultz said, "and there's no way for either you or them to know that until you've got something tangible up and running."

"RIPP makes sense to me because it works," said Thomas O'Sullivan, systems section project manager for Du Pont's chemicals and pigments department, which has worked with IEA on several CASE projects.

"You've got to define the rules of the game before you play the game. If you don't, you're in trouble," O'Sullivan commented.

RIPP enthusiasm

Both the RIPP methodology and the user-involved philosophy drew enthusiastic comment from Turnow and Anderson.

"RIPP was a definite plus," according to Turnow. "It let us see what we were going to get. Even more important is that IEA gets the user involved. The result is more excitement on the front end and no surprises on the back. Problems get worked out mid-cycle instead of hitting you in the face later when you're not expecting them."

The human side of CASE, O'Sullivan said, is equally critical to an end product that works. "Building a system isn't like selling a calculator," he said. "It's more like a marriage. And if it goes wrong, it's more like a divorce.

In fact, Turnow said, problems arose during the IEA project. "The whole system got a lot bigger than we thought it was going to." IEA, he said, "bit the bullet and did the extra work that was required."

"The worst part of working with IEA was that we found discrepancies between what we thought we were getting and what it turned out we were getting," Anderson added. "The best part was that they fixed it."

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Wilder

CONTINUED FROM PAGE 105

ments and National Semiconductor.

No matter how you slice it, it's an exclusive club compared with other U.S. industries. In the 1987 Fortune 500, there were 28 oil companies, 14 pharmaceutical makers, 13 steel makers, 16 industrial and farm equipment vendors, 19 forest products concerns, 28 chemical companies, 14 aerospace firms and no less than 35 food industry representatives posting annual revenue of 10 or more figures.

In service industries, the contrast is even more striking. In 1986, Electronic Data Systems and Automatic Data Processing were the computer industry's only representatives among 69 billion-dollar diversified service firms.

Select few

It's clear that the moniker "big business" applies to only a handful of players in the computer field. There are two main reasons for this.

The first is the industry's relative youth, particularly with regard to the number of players. Industry granddaddies like NCR and Burroughs date back to the Henry Ford era, but the vast majority of vendors are less than 20 years old, and a huge number, including Compaq, were born in this decade. The industry's dizzying growth rates since the 1960s have propelled its leading players into America's corporate elite so fast that observers often forget how young the industry really is.

To put this in perspective, try this trivia question: What is the largest U.S. company still run by its founder? Answer: DEC, with Ken Olsen at the helm.

The second reason for the small size of the billion-dollar computer club is the industry's unique configuration, with its market leader seven times the size of its nearest competitor. Until the last couple of years, IBM's profits alone were often larger than the No. 2 vendors' revenues.

In no other U.S. industry segment is there a gap that comes anywhere close to IBM's dwarfing of the other guys. On Fortune's 1986 lists, Goodyear, at about 2½ times the size of Firestone, was the only industry leader that even doubled the size of its next largest competitor.

So Compaq, a company without a traditional sales organization that relies almost exclusively on dealer distribution, is up there with the big boys — roughly in the same size league as Tandem, Amdahl and Data General.

Meanwhile, Compaq should not gloat too much about its making the billion-dollar mark faster than any other company. Sun Microsystems, with its most recent quarter ringing in at $235 million in revenue, may beat Compaq's record in the very near future.

But for now, down in the heart of oil country, Rod Canion and his charges are mighty proud. If Phil Estridge and IBM created the business microcomputer industry, Canion and Compaq redefined it. They extended the IBM standard and laid the track for the roller coaster IBM-compatible micro business.

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Wilder is *Computerworld's* senior editor, computer industry.

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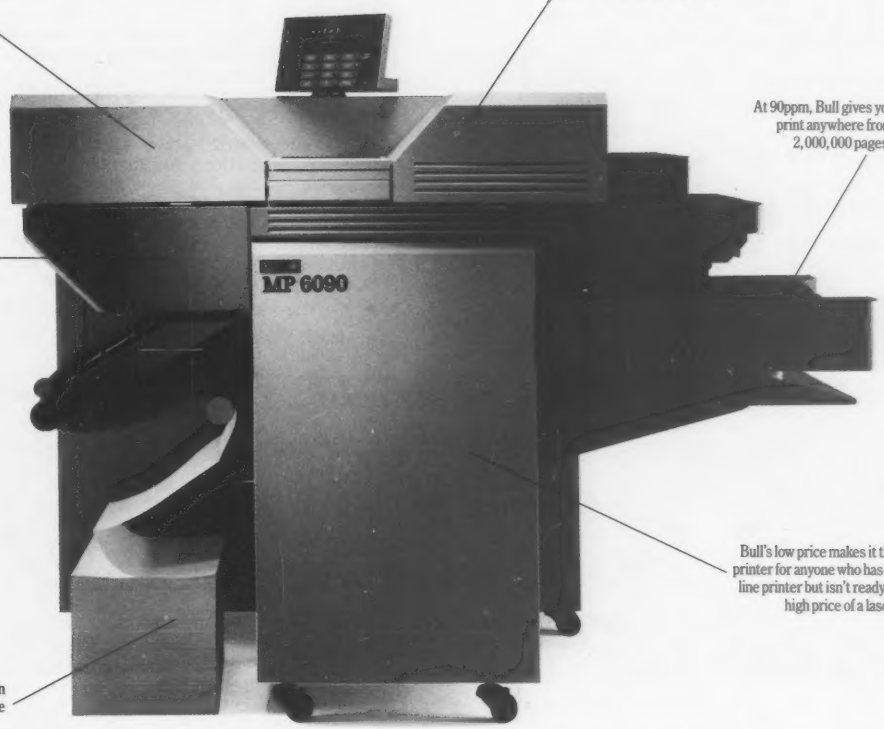

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COMPUTER CAREERS

Calamities spark growing field

Threat of fraud, natural disasters create openings for security analysts

BY JANET MASON
SPECIAL TO CW

Once limited to government and financial institutions and largely overlooked by top management elsewhere, the need for data security is gaining recognition in many industries.

The prevalence of personal computers and a government requirement that banks establish disaster recovery plans are just two factors in the increasing corporate awareness of the importance of security professionals.

Data center calamities coupled with top managers' being held personally liable for fraud perpetrated in their companies are also heightening management's awareness of both disaster recovery and information security. At least 10 computer room disasters in the past year — including fires, floods and an earthquake — brought home the message that a disaster can happen to any company, says Jack Bannan, information security manager for corporate MIS at General Electric Co.

Expert system security

Another growth area is in securing expert systems; without security, a company could lose information and actual expert logic processes to a competitor.

Data security professionals are responsible for thwarting threats to corporate information from outside hackers or internal employees. Often, the role is coupled with responsibility for disaster recovery and contingency planning. "The two go hand in hand," Bannan says. "They both deal with preventing threats to the computer — physical and data threats."

While many data security professionals divide their time between data security and disaster recovery, others attend solely to the security side.

Some companies, however, relegate data security as just one of the many responsibilities of a top MIS person. "This distribution or responsibility may make management feel better," says Sanford Sherizen, a Natick, Mass.-based information security consultant, "but it really doesn't help that much. Companies need at least one full-time information security employee."

The lowest level security professional is generally someone at the analyst level, paid a salary in the $30,000 range. The next highest level, the senior analyst position, is typically paid about $38,000. Beyond that rank is the first-level manager earning in the low forties. At the highest level is the data security officer, with an income in the mid-fifties.

Major metropolitan areas on the East and West Coasts are the best areas of the country for information security positions. Jobs are also plentiful in the Washington, D.C., area, with a concentration in the Department of Defense and related private sector companies.

MAJOR METROPOLITAN areas on the East and West Coasts are the best areas of the country for information security positions. Jobs are also plentiful in the Washington, D.C., area, with a concentration in the Department of Defense and related private sector companies.

Finance, government hot

Finance and government still top the list of institutions employing data security professionals. The prime employers are large banks, brokerage centers and savings and loans organizations.

Telecommunications firms, threatened by hackers stealing "free" telephone time and browsing through data bases, are also becoming major markets for data security positions. Other industries with a growing interest in security professionals are large manufacturing firms, retail holding companies and oil companies.

Although information security education programs do exist, most companies prefer professionals who possess considerable MIS experience, rather than someone straight out of school. In general, information security professionals are usually plucked from the ranks of data processing with a background spanning programming and management.

For example, Art Grande, assistant vice-president of MIS in charge of data security at the First Pennsylvania Bank NA in Philadelphia, counts 21 years at the bank, seven of which he spent in data security. Grande attended professional seminars on data security and joined the Computer Security Institute in Northboro, Mass. His responsibilities are to establish yearly goals and objectives and to administer the data security unit.

Dennis Boecker, data security officer with Uniroyal Goodrich Tire Co. in Akron, Ohio, divides his time between disaster recovery and the physical security of the data center. The company assigns another MIS employee part-time to handle data security. Boecker started in MIS working with systems and then moved into management. Boecker says the skill most valuable to his present position is the ability to work and communicate with all types of people.

Testing carried out daily

Boecker's daily responsibilities include testing systems at the company's outside hot site to make sure they will run in the event of a disaster. On the physical side, he watches for security breaches that "may not be anything or may result in equipment being destroyed" and passes the information on to upper management. He also follows technological developments in detectors, cameras, badge readers and so forth and makes sure only authorized people enter the data center.

The information security position, according to GE's Bannan, is ideal for a bright person with an MIS background "who is quick to pick things up and good with the internal workings of the computer."

Ironically, these are the same characteristics of successful hackers. Do former hackers make good information security people? "It has been done," Bannan says, "but it's a little like having an ex-bank robber guard the bank."

Mason is a Philadelphia-based freelance journalist.

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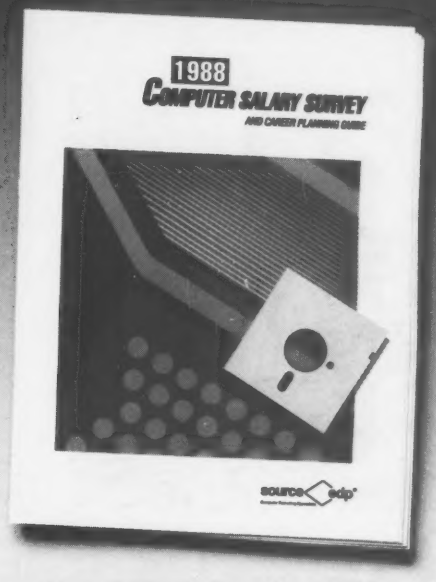

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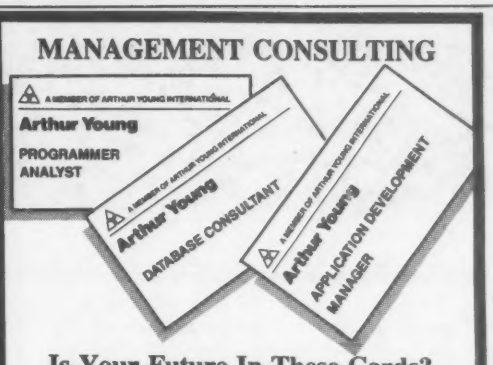

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LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164

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Or call for more information at
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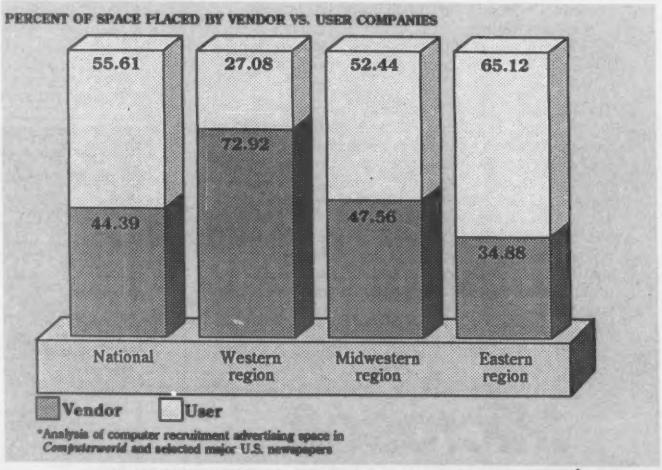
CAREER INDEX

December 1987 computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

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The RAND Corporation, located in Santa Monica, California, is a private, non-profit institution engaged in research and analysis of matters affecting national security and the public welfare and in the operation of doctoral degree programs. Our expanding research efforts in these areas offer qualified software professionals the opportunity to work as part of multi-disciplinary teams solving some of this country's toughest problems.

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— Max Steiner
Director of Marketing
Kenda Systems, Inc.

Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

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MARKETPLACE

PC blizzard or snow job?

IBM turns attention to PS/2, abandons resellers, users and older line

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

As the snow blew across New England early this month, the used microcomputer market experienced its own blizzard. Buyers and sellers alike scrambled for equipment throughout the early part of February.

IBM trading activity was clouded by the increase in Personal System/2 new equipment sales quotas. An increase in gray market activity is going to be the end result of this IBM blunder.

When asked for their reaction, many C-level resellers expressed anger, and a few said they were surprised. IBM abandoned both its Personal Computer lines and the average user months ago when it introduced what should have been called CS/2 — the Corporate System/2. Now IBM is abandoning the average dealer.

As one reseller stated, "Consistency builds trust, and IBM has been everything except consistent." Another trader added, "They're feeding their own gray market, then they'll beef that we sell at discount."

In spite of IBM's PS/2 push, its PC models remain the favorite among average users. The dual-floppy drive classic, the PC Model 076, closed up, at $800, in the week ended Feb. 5, experiencing a resurgence in demand.

The PC XT Model 086 held even at $1,350, with few quantity transactions. The XT Model 089 closed down $25, at $1,650, experiencing the full effect of vaporware sales — a change in market price expectations.

IBM's PC AT lines performed well. The AT Model 099 closed even at $2,300 despite a decrease in trading volume. The "queen," the PC AT Model 339, continued its reign closing at $3,350 despite the bantering of its name by vaporware vendors.

Compaq fares well

Compaq Computer Corp. trading experienced an increase in activity across the board. The luggable Portable I closed up $50, at $750, as single-unit transactions dominated. The Portable II closed down, at $1,675, as user demand for power portables seems to be shifting to truly portable machines like the Toshiba Corp. T1200.

The Portable III traded at $2,700 with few units available on the used market. The 20Mbyte Deskpro 286 was bringing in a price of $2,275 at the close of trading Feb. 5.

Compaq used equipment trading continues to flourish, and the final evidence of the company's success may be seen in recent advertisements for its Intel Corp. 80386-based clone. Many of these "Brand X" machines claim they are "IBM and Compaq compatible," and traders state, "It's a Compaq clone."

Apple buyers puzzled

Buyers of Apple Computer, Inc.'s Macintosh are in a quandry comparable to that of IBM buyers. Just what is the Mac II? And where is Steve Jobs when you need him? Where is the *real* systems integrator?

The Mac II dropped in value the first week of this month to close at $4,000. Instead, users sought Mac Plus and Mac SE models. The Mac Plus traded down at $1,250, experiencing an increase in supply, while the SE held even at $1,900. The Mac 512 and Mac 512E traded at $825 and $975, respectively, with a steady base of demand by first-time users.

Questionable trade practices by the Intel Systems Group in Hillsboro, Ore., have raised concerns that the firm does not know the rules of fair trade for excess inventory transactions. Trading rules apply to all players, even novices.

The Boston Computer Exchange can be reached at 800-BOCOEXX, or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Feb. 5, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$350
XT Model 086	$1,350	$1,425	$800
XT Model 089	$1,650	$1,900	$1,000
AT Model 099	$2,300	$2,900	$1,950
AT Model 339	$3,350	$3,500	$2,400
Compaq Portable I	$750	$975	$600
Portable II	$1,675	$1,900	$1,475
Portable III	$2,700	$3,000	$2,175
Plus	$1,325	$1,400	$975
Deskpro 286	$2,275	$2,500	$2,050
Deskpro 386	$4,325	$4,600	$4,000
Macintosh 512	$825	$900	$650
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,900	$2,150	$1,700
II	$4,000	$4,200	$3,500

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The pros and costs of data processing training: necessity or luxury?

BY MICHAEL BALL
SPECIAL TO CW

MIS management typically views training either as a necessity whose cost cannot be measured in dollars and cents or as an expendable item too expensive to justify in the budget.

At American Family Mutual Group in Madison, Wis., training is not governed by cost justification. "We learned a long time ago you can't be short on training," says Don Breitenbach, vice-president of MIS. "We don't find it has to be justified. If you do things right the first time, it saves a lot of money."

At Southland Corp. in Dallas, "We made a decision a long time ago to hire only people with two to three years experience for our entry-level [positions]," says Dave Karney, vice-president of MIS.

Because of the size of the company's MIS operation, "We decided not to set up an entire training organization. From a cost standpoint, we couldn't justify a permanent training group," Karney adds.

Managers report that they spend between 1% and 4% of their total MIS budgets on training. Comparisons are difficult because not all companies measure training expenditures in the same manner.

American Family Mutual managers look at how much of an employee's work year goes to training. "We devote about 8% of a particular person's time to it and have [done so] for about 10 years," Breitenbach says.

> "WE LEARNED a long time ago you can't be short on training. We don't find it has to be justified. If you do things right the first time, it saves a lot of money."
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> DON BREITENBACH
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Out of American Family Mutual's $27 million MIS budget, only about $100,000 can be directly charged to training. "Even if you add the eight or nine people [involved full time], it wouldn't exceed $300,000 or $400,000," Breitenbach says.

Similarly, at Champion International Corp. in Courtland, Ala., "We don't think of it as dollars, but training is a large part of our time budget," says Hank Livingston, operations chief. "Even if you add travel for training, it might be 3% to 4% of our budget, perhaps $70,000 to $100,000 a year," he adds.

"I put training costs in my budget," Livingston says, "I am ready for any questions, because I have the answers. So far, there has never been a question." Champion International's attitude is, "If we don't provide training and use the staff and systems we have, the whole investment is wasted," Livingston adds.

An even more discrete system of training justification is in place at Ohio Bell in Cleveland. Operations district manager Greg Flick oversees a separate training program geared toward the needs of the operations staff. "About a year and half ago, we justified separating our training," Flick says.

The change was made because the operations training provided in the central MIS program was not keeping up with the rapid equipment and software changes in the operations area.

Ball is a free-lance writer based in Boston.

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Training Section

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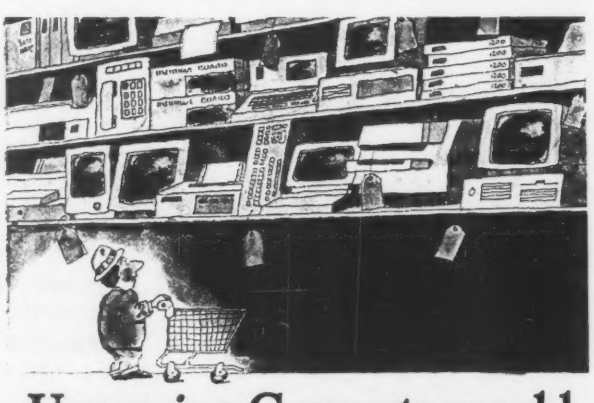

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Issue Date	Topic	Ad Closing Date
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

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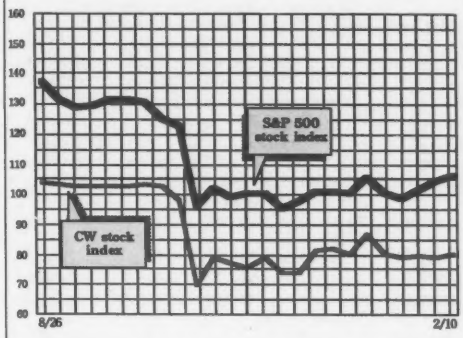
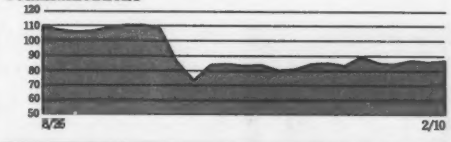
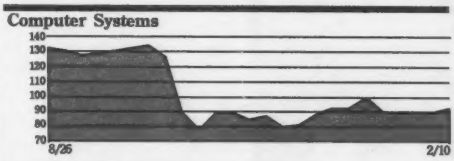


Indexes	Last Week	This Week
Communications	85.6	86.6
Computer Systems	88.7	91.1
Software & DP Services	92.5	92.3
Semiconductors	53.1	55.9
Peripherals & Subsystems	80.0	80.3
Leasing Companies	101.6	102.6
Composite Index	78.9	80.3
S&P 500 Index	104.3	106.1

Communications



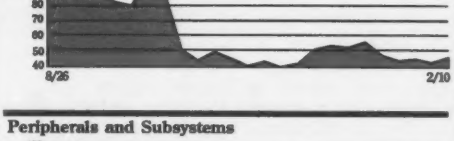
Computer Systems



Software and DP Services

Semiconductors

Peripherals and Subsystems



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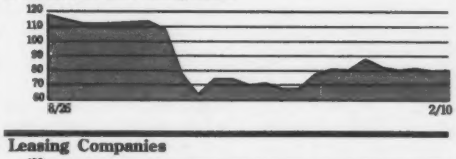

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CLOSING PRICES WEDNESDAY, FEBRUARY 10, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE FEB. 10 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	100	74	94.63	2.0	2.2
Q	ANDREW CORP	19	11	13.75	0.3	1.9
Q	ARTEL COMM CORP	5	2	1.50	0.0	0.0
N	AT&T	36	20	29.75	0.3	0.8
Q	AVANT GARDE COMP INC	6	2	2.00	0.1	6.7
Q	AVANTEK INC	19	6	6.88	-0.1	-1.8
N	AYDIN CORP	38	16	20.25	-0.3	-1.2
N	BELL ATLANTIC CORP	80	61	73.38	1.5	2.1
N	BELLSOUTH CORP	44	29	41.75	0.9	2.1
Q	COMPRESSION LABS INC	8	2	3.50	-0.5	-12.5
O	COMPUTER NETWORK TECH	6	2	1.69	-0.1	-3.5
O	CONTEL CORP	40	25	34.38	0.4	1.1
Q	DATA SWITCH CORP	9	4	5.88	0.1	2.2
Q	DIGITAL COMM ASSOC	49	20	28.50	2.4	9.1
Q	DYNATECH CORP	43	14	19.00	0.0	0.0
Q	FIBRONICS INTERNATIONAL INC	11	2	2.38	0.0	0.0
Q	GANDALF TECHNOLOGIES	11	5	5.50	-0.3	-4.3
Q	GENERAL DATACOMM INDS	14	3	3.50	-0.1	-3.4
N	GTE CORP	45	29	38.25	-0.4	-1.0
Q	INFOTRON SYS CORP	12	5	6.75	0.0	0.0
N	ITT CORP	66	42	46.00	0.0	0.0
N	M/A COM INC	16	7	10.38	0.8	7.8
Q	MCI COMMUNICATIONS CORP	12	5	10.75	-0.3	-2.3
Q	MICOM SYS INC	17	7	10.50	0.5	5.0
Q	NETWORK SYS CORP	19	7	7.25	-0.3	-3.3
N	NORTHERN TELECOM LTD	24	14	18.38	0.6	3.5
Q	NOVELL INC	30	12	19.25	1.5	8.5
N	NYNEX CORP	78	58	70.13	0.4	0.5
N	PACIFIC TELESIS GROUP	34	9	29.88	0.8	2.6
N	PARADYNE CORP	9	4	4.38	0.1	2.9
A	PENRIL CORP	6	1	3.25	-0.1	-3.7
N	PLESSEY PLC	41	23	25.75	-1.9	-6.8
N	SCIENTIFIC ATLANTA INC	20	8	12.88	0.5	4.0
N	SOUTHWESTERN BELL CORP	46	22	38.63	1.3	3.3
Q	3 COM CORP	26	12	18.63	1.4	8.0
N	TIMEPLEX INC	41	17	32.25	0.0	0.0
Q	UNGERMANN BASS INC	16	5	8.50	1.1	15.3
N	U S WEST INC	60	43	54.75	0.6	1.2
Computer Systems						
Q	ALLIANT COMPUTER SYS	37	5	6.88	-0.9	-11.3
Q	ALPHA MICROSYSTEMS	6	3	4.13	0.0	0.0
Q	ALTOS COMPUTER SYS	17	9	10.50	-0.5	-4.5
A	AMDAHL CORP	50	19	33.13	3.1	10.4
Q	APOLLO COMPUTER INC	25	9	13.13	0.9	7.1
Q	APPLE COMPUTER INC	60	26	41.00	1.5	3.8
N	BOLT BERANEK & NEWMAN	30	12	13.88	-0.6	-4.3
Q	BRITTON LEE INC	5	1	1.38	-0.1	-8.3
N	COMPAQ COMPUTER CORP	79	26	46.25	2.6	6.0
Q	COMPUTER AUTOMATION INC	17	5	13.00	2.8	26.8
A	COMPUTER CONSOLES INC	12	2	4.88	0.0	0.0
Q	CONCURRENT COMP CORP	24	11	16.75	0.0	0.0
N	CONTROL DATA CORP DEL	38	18	22.25	0.5	2.3
Q	CONVERGENT TECH	12	3	3.13	0.0	0.0
Q	CONVEX COMPUTER CORP	22	6	7.13	-0.5	-6.6
N	CRAY RESH INC	136	47	75.88	7.3	10.6
Q	DAISY SYS CORP	13	5	7.00	0.0	0.0
N	DATA GEN CORP	39	16	27.38	1.5	5.8
N	DATAPOINT CORP	9	3	3.88	-0.5	-11.4
N	DIGITAL EQUIP CORP	200	110	120.50	4.5	3.9
N	FLOATING POINT SYS INC	17	3	4.00	0.0	0.0
N	GOULD INC	34	8	10.88	0.0	0.0
N	HARRIS CORP	43	22	27.75	0.9	3.3
N	HEWLETT PACKARD CO	74	36	57.25	4.1	7.8
N	HONEYWELL INC	91	49	61.00	0.0	0.0
N	IBM	176	102	111.63	2.6	2.4
Q	INFORMATION INTL INC	17	9	11.50	-0.4	-3.2
Q	IPL SYS INC	3	1	1.75	0.3	16.7
N	MASS COMPUTER CORP	14	5	5.63	0.3	4.7
N	MATSUSHITA ELEC INDL LTD	196	93	173.88	1.9	1.1
Q	MEGADATA CORP	7	3	3.13	0.0	0.0
Q	MENTOR GRAPHICS CORP	39	14	22.00	2.0	10.0
N	NBI INC	14	4	4.00	0.0	0.0
N	NCR CORP	87	50	58.88	2.4	4.2
N	PRIME COMPUTER INC	31	12	17.88	2.0	12.6
Q	PYRAMID TECHNOLOGY	12	5	8.13	-0.1	-1.5
Q	STRATUS COMPUTER	41	15	23.75	2.0	9.2
Q	SUN MICROSYSTEM INC	46	14	32.88	3.1	10.5
Q	SYMBOLICS INC	6	1	1.56	-0.1	-3.8
N	TANDEM COMPUTERS INC	38	17	19.00	0.3	1.3
N	TANDY CORP	57	28	35.50	0.0	0.0
N	ULTIMATE CORP	37	15	15.75	-0.3	-1.6
N	UNISYS CORP	48	24	34.50	3.1	10.0
A	WANG LABS INC	19	10	14.38	0.5	3.6
Software & DP Services						
Q	ADVANCED COMP TECH	6	1	1.63	-0.3	-13.3
N	AGS COMPUTERS INC	30	11	15.00	1.4	10.1
Q	AMERICAN MGMT SYS INC	20	9	15.00	1.5	11.1
Q	AMERICAN SOFTWARE INC	22	6	9.63	-0.5	-4.9
N	ANACOMP INC	11	4	7.75	0.8	10.7
Q	ANALYSTS INTL CORP	10	4	7.00	-0.4	-5.1
Q	ASHTON TATE	33	13	25.00	2.0	8.7
Q	ASK COMPUTER SYS INC	17	6	10.63	0.5	4.9
Q	AUTODESK INC	34	12	17.75	0.8	4.4
N	AUTO DATA PROCESSING	55	16	42.00	1.0	2.4
Q	BOOLE & BABBAGE INC	12	5	8.00	-0.3	-3.0
N	COMPUTER ASSOC INTL INC	37	15	29.00	1.0	3.6
Q	COMPUTER HORIZONS CORP	15	7	9.00	-0.4	-4.6
N	COMPUTER SCIENCES CORP	73	42	48.75	1.8	3.7
N	COMPUTER TASK GROUP INC	18	9	9.63	-0.3	-2.5
Q	COMSHARE INC	28	12	13.50	-1.0	-6.9
N	CULLINET SOFTWARE INC	14	4	5.88	-0.4	-6.0
Q	CYCARE SYS INC	10	6	7.88	0.0	0.1
Q	DUQUESNE SYS INC	33	10	18.50	0.4	2.1
A	DATA ARCHITECTS INC	17	7	9.38	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	37.50	0.8	2.0
Q	HOGAN SYS INC	17	5	4.50	-0.1	-2.7
Q	INFORMIX CORP	31	12	20.25	0.3	1.3
Q	INTELLICORP INC	11	2	2.75	-0.1	-4.3
Q	KEANE INC	10	6	7.50	0.5	7.1
Q	LOTUS DEV CORP	40	19	27.00	0.8	2.9
Q	MANAGEMENT SCI AMER	21	6	6.13	0.4	6.5
Q	MICRO PRO INTL CORP	8	3	3.50	0.1	1.8
Q	MICROSOFT CORP	79	33	53.75	1.0	1.9
Q	MORINO ASSOCIATES INC	24	7	15	0.1	0.9
Q	NATIONAL DATA CORP	34	19	26.50	0.5	1.9
Q	ON LINE SOFTWARE INTL INC	22	9	9.63	-0.1	-1.3
Q	ORACLE SYS CORP	19	7	13.63	1.4	11.2
N	PANSOPHIC SYS INC	28	11	16.00	1.3	8.5
Q	POLICY MGMT SYS CORP	30	15	21.50	0.8	3.6
Q	PROGRAMMING & SYS INC	14	7	10.25	0.1	1.2
Q	REYNOLDS & REYNOLDS CO	39	14	17.25	-0.8	-4.2
Q	SEI CORP	18	10	14.25	-0.8	-5.0
Q	SHARED MED SYS CORP	53	19	25.00	-0.4	-1.5
Q	SOFTWARE AG SYSTEMS INC	19	7	7.63	-0.1	-1.6
Q	SOFTWARE PUBG CORP	17	5	9.13	0.5	5.8
A	STERLING SOFTWARE INC	14	6	8.13	-0.1	-1.5
Q	SUNGARD DATA SYS INC	21	10	15.75	0.5	3.3
Q	SYSTEMATICS INC	30	19	28.75	1.8	6.5
N	SYS. SOFT INC.	24	7	14	1.5	12.2
Q	VM SOFTWARE INC	45	7	9.75	1.5	18.2
Semiconductors						
N	ADV MICRO DEVICES INC	25	8	9.88	0.4	3.9
N	ANALOG DEVICES INC	24	8	11.13	0.4	3.5
Q	ANALOGIC CORP	13	5	7.00	-0.3	-3.4
Q	INTEL CORP	42	18	26.00	2.5	10.6
Q	LSI LOGIC CORP	17	7	8.38	0.6	8.1
N	MOTOROLA INC	74	35	43.50	3.4	8.4
N	NATL SEMICONDUCTOR	22	10	10.38	0.4	3.8
N	TEXAS INSTRS INC	80	36	46.75	3.8	8.7
A	WESTERN DIGITAL CORP	33	11	11.88	0.6	5.6
Peripherals						
Q	ALLOY COMP.	13	4	3.63	-0.5	-12.1
N	AMI INTL INC	9	3	3.88	-0.3	-6.1
Q	ASTRONAMI CORP	23	6	9.38	0.1	1.1
Q	AUTO TROL TECH CORP	9	3	3.94	-0.1	-1.6
Q	BANCTEC INC	16	5	6.38	-0.1	-1.9
Q	CIPHER DATA PRODS INC	18	4	6.88	-0.3	-3.5
A	COGNITRONICS CORP	5	2	2.88	0.0	0.0
N	COMPUGRAPHIC CORP	28	19	23.00	0.6	2.8
N	COMPUTERVISION CORP	23	7	0.00	-14.9	-100.0
A	DATAPRODUCTS CORP	24	7	7.63	0.0	0.0
Q	DATARAM CORP	9	5	6.06	0.1	1.1
N	DECISION INDS CORP	13	4	10.75	0.1	1.2
N	EASTMAN KODAK CO	71	40	41.50	0.6	1.5
Q	E M C CORP MASS	29	10	14.00	1.5	12.0
Q	EMULEX CORP	9	4	7.00	1.8	33.3
Q	EVANS & SUTHERLAND	40	18	21.50	1.5	7.5
Q	ICOT CORP	13	3	3.88	-0.4	-8.8
Q	INTERLEAF INC	24	9	17.63	1.8	11.0
Q	IOMEGA CORP	8	1	2.75	-0.1	-4.3
Q	LEE DATA CORP	10	3	3.75	-0.1	-20.0
Q	MASSTOR SYS CORP	6	1	1.81	-0.2	-9.4
Q	MAXTOR CORP	34	6	10.88	-0.1	-1.1
Q	MICROPOLIS CORP	44	13	21.25	2.8	14.9
Q	MINISCRIBE CORP	18	5	8.13	0.8	10.2
N	MINNESOTA MNG & MFG CO	84	45	57.50	0.3	0.4
A	MSI DATA CORP	24	12	21.75	-0.3	-1.1
Q	PRIAM CORP	6	1	1.63	0.1	8.3
Q	PRINTRONIX INC	13	7	8.63	0.0	0.0
N	QMS INC	27	8	8.38	-0.4	-4.3
Q	QUANTUM CORP	35	8	10.75	0.3	2.4
Q	RAMTEK CORP	6	2	4.13	0.1	3.1
N	RECOGNITION EQUIP INC	24	7	9.13	0.0	0.0
Q	REXON INC	14	5	6.00	0.0	0.0
Q	SCAN TRON CORP	14	7	10.25	0.0	0.0
Q	SEAGATE TECHNOLOGY	46	10	16.63	1.5	9.9
N	STORAGE TECH CORP	5	1	1.88	-0.1	-6.3
Q	TANDON CORP	7	1	1.50	-0.1	-7.7
A	TEC INC	7	3	5.38	0.3	4.9
N	TEKTRONIX INC	43	21	24.00	0.8	3.2
Q	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
N	TELEX CORP	102	30	49.38	1.3	2.6
Q	WYSE TECH	40	11	18.25	1.3	7.4
N	XEROX CORP	85	50	55.75	1.9	3.5
Q	XIDEX CORP	16	6	7.00	0.1	1.8
Leasing Companies						
Q	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.00	-0.1	-3.0
N	COMDISCO INC	37	12	19.00	0.8	4.1
N	CONTINENTAL INFO SYS	14	5	6.50	0.5	8.3
Q	PHOENIX AMERN INC	8	2	2.75	-0.1	-4.3
Q	SELECTERM INC	6	3	4.00	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

Q-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Round 2

Cray leads comeback as most tech stocks get off the ropes

The Department of Commerce's announcement that the U.S. trade deficit had narrowed to $12.2 billion in December helped put computer stocks back in fighting trim last week after sagging almost across the board in action a week earlier. Leading the rebound as of Thursday's market close was Cray Research, Inc., whose introduction of the $20 million Y-MP/832 supercomputer (see story page 8) spurred its stock up 6 points to finish at 76.

Other leading issues that came in winners included Hewlett-Packard Co., which jumped 4⅜ points for the week to 57¼; Digital Equipment Corp., up 4¾ points to 120; IBM, which dropped to as low as 107¼ on Tuesday but rallied to finish up 3¼ points at 111¼; NCR Corp., which jumped 3⅛ points to 59¾; Sun Microsystems, Inc., up 3½ points to 33¾; and Microsoft Corp., up 3¼ points to 54¾.

More modest gainers included Ashton-Tate Corp., which rose 2⅝ points for the week to 24⅞; Unisys Corp., up 2½ points to 34⅜. Novell, Inc., which gained some of the ground it lost a week earlier when shipment delays were revealed, rose 2 points to 20.

JAMES DALY

Unix makes headway in commercial market

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — The Uniforum 1988 trade show and conference held here last week gave evidence that Unix is slowly but surely making its way into the commercial market.

The biggest boost of all came from IBM and Apple Computer, Inc. Both companies worked hard to convey a Unix commitment. While Apple Chief Executive Officer John Sculley gave the Uniforum keynote address on the main floor of the Infomart, William C. Lowe, president of IBM's Entry Systems Division, was two floors above him at the IBM Infomart showroom presenting his ideas on Unix to the press.

"Now that those two [companies] are really involved, there is no question that Unix has made it," said Omri Serlin, president of Itom International, Inc., a consulting firm in Los Altos, Calif. "You'd be hard-pressed today to find many serious commercial applications, but you can't overlook Unix's momentum."

AT&T detailed plans for its Unix System V, Release 4, which includes a number of features intended for more commercial applications.

Release 4, expected to go to beta-test sites next year, will include real-time capabilities — the lack of which has been a big drawback for Unix — better systems operation, maintenance, maintenance facilities and backup and restore features, according to AT&T.

"Unix is moving into the mainstream, but that doesn't mean people are going to throw their current operating systems out," said Robert Ackerman, chief marketing officer at X/Open Ltd. "It's a step-by-step progression of open systems coexisting with proprietary systems."

Into the mainstream

Technical product demonstrations outweighed commercial applications at the 237 vendor exhibits, but mainstream applications made a strong showing.

In addition, there were other operating system releases geared toward the commercial environment. Texas Instruments, Inc. introduced Release 2.2 of the TI System V operating environment for its System 1500. It includes Extended Symmetric Processing, a feature that allows processors in a multiprocessor configuration to share jobs equally.

A number of hardware suppliers announced plans to offer data base management systems and office automation applications on their platforms.

Tandem Computers, Inc. announced the availability of Informix, Inc.'s Informix-Turbo data base server on its Unix-based system, and Harris Corp. said it will offer Unify Corp.'s Accell fourth-generation language development environment for its CX line of superminicomputers.

Highlights of AIX software

IBM introduced last week more than two dozen pieces of software intended to help put together the AIX family of workstations.

The company also announced its plans to work with the National Bureau of Standards (NBS) to develop conformance tests for Unix software. AT&T, X/Open and other organizations have been involved with the NBS on conformance tests for more than a year.

Among the highlights of the new AIX workstation software are the following:

- Version 2.2 of the AIX operating system for IBM's RT Personal Computer, which includes more device and communications protocols support. An initial shipment is scheduled for June, and Transmission Control Protocol/Internet Protocol and IBM Systems Network Architecture enhancements are slated to be out in September. A 16-user license is $2,295; a 17- to 32-user license is an additional $1,700. The upgrade charge from Version 2.1 is $395.
- The Distributed Services package for both the RT PC and IBM's Personal System/2 running the AIX operating system. A copy of the operating system and Distributed Services must be installed on each system participating in this environment. It is intended to allow users to access local and remote resources, such as printers, without knowledge of the resources' actual location. The RT PC version has a license fee of $600; the PS/2 license is $400. Both are scheduled for delivery in March 1989.
- The AIX/RT DOS Server, which provides the ability to set up an RT PC as a file or print server for the DOS Version 3.0 system. It provides automatic conversion of data and files between AIX and DOS formats. Slated to be available in March 1989, the product carries a license fee of $225.

The AIX PS/2 DOS Server provides the same functions on a PS/2 running AIX. IBM said it will also be available in March 1989 and can be licensed for $225.

- Both RT PC and PS/2 users will have Sun Microsystems, Inc.'s Network File System (NFS) available to them. Data can be accessed via NFS on any system that also supports NFS. The RT PC version will be licensed at $995 and available in September; the PS/2 license is $400 and will be available in March 1989.
- X Window System support is scheduled to be offered for the PS/2 in September at a cost of $195. IBM had previously announced X Window System support for the RT PC.

ROSEMARY HAMILTON

IBM

FROM PAGE 1

- Elevating the RT PC from a specialized mid-range offering to a general-purpose mid-range system with a strategic status comparable to IBM's 9370 and System/36 and 38.
- Phasing out its multiple Unix versions in favor of AIX, which will eventually span its entire 370 product line.
- Expanding the AIX workstation family, a blend of the RT PC and IBM Personal System/2 platforms running AIX.

At a conference for software developers that IBM hosted in Dallas last week, Larry Ford, the firm's assistant group executive for mid-range systems, told attendees there are three major areas of opportunity for independent development: the 9370 platform, the System/36 and 38 and so-called Silverlake follow-on platform and the RT PC. Previously, IBM had identified only the 9370 and System/36 and 38 platforms for general-purpose mid-range computing.

Beyond the mid-range

AIX, however, will play a role beyond the mid-range market, executives said. The goal is to run AIX from the PS/2s to IBM's 3090s. AIX will become the only Unix offering from IBM as the multiple Unix versions it currently provides are phased out.

But this plan has a kink in it. Unix is not a part of IBM's Systems Application Architecture (SAA), the portability standard that IBM's Ford said "will go down in history as IBM's most important announcement."

SYSTEMS Application Architecture "will go down in history as IBM's most important announcement."

LARRY FORD
IBM

According to William C. Lowe, president of IBM's Entry Systems Division, AIX will be made consistent with the strategic SAA where possible. In areas of incompatibility, such as the user interface, IBM will provide bridges to link the two worlds.

"We plan to provide products as leaders in the Unix market," Lowe said.

But some industry observers said otherwise. Omri Serlin, president of consulting firm Itom International, Inc., said IBM is still not fully commited to Unix. "All this brave talk about AIX is probably only true for the Entry Systems Division," which has control over the RT. The division "is very defensive about the RT. I think to the rest of the corporation, Unix still holds very little interest."

Other observers said that IBM intends well but that it will have trouble reaching this goal. "The Unix market may be just too open," Infopro's Fiedler said. "People in the Unix market aren't going to say we have to have IBM."

Along with statements of direction, IBM introduced products for the AIX workstation family. The enhancements, many of which will not be available until 1989, are intended to help blend the RT PC and PS/2 environments (see story above). The concept of the AIX workstation family was first presented last year. The workstations will be offered as general-purpose systems that range from low-end single-user models to a mid-range machine, IBM executives said. Last week's announcement included a facility that would allow an RT PC to support up to 32 users in native mode.

Under umbrella

The RT PC and PS/2 Model 80 will serve as the two hardware platforms under the AIX umbrella. According to Lowe, IBM is now pouring an equal amount of money and resources into RT PC and PS/2 efforts.

The RT PC was not included in the ranks of the 9370 and System/36 and 38 when IBM executives discussed the mid-range in the past. Ford said it has been presented as a two-pronged stragegy "when we discuss where we've been the longest."

"In terms of opportunity, it's Unix and the RT PC," he added.

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AT&T, Sun: Unix to remain open

BY JULIE PITTA
CW STAFF

DALLAS — AT&T and Sun Microsystems, Inc. spent much of their time at last week's Uniforum 1988 trying to allay fears that their partnership will result in an unfair advantage for workstation vendor Sun.

At the same time, the two companies picked up an ally in Amdahl Corp., which said it will use the combined Sun and AT&T operating system as the base operating environment for its future Unix offerings.

The evening before the show opened, AT&T hosted a gathering of 100 of its licensees, intending to assure them that despite the company's agreement to develop Unix System V, Release 4 cooperatively with Sun, Unix will remain an open system.

"AT&T went to lengths to assure people that Sun wouldn't have an advantage," said Charles Smith, product marketing manager for Tektronix, Inc.'s workstation division. "But there's still some apprehension out there."

AT&T was among the first computer vendors to license Sun's Scalable Processor Architecture (Sparc) for use in its own systems.

Both alliances have fueled speculation that Release 4 will be optimized for the proprietary Sparc. Additionally, critics have said that Sun, which will be part of Release 4's development team, can bring products running the new release of Unix to market more quickly because it will know the specifications first.

Critics gather forces

Critics of the partnership have joined forces in what has been called the Hamilton Group, so named because their first meeting was held on Hamilton Avenue in San Jose, Calif. Members of the group, including Digital Equipment Corp., Apollo Computer, Inc. and Hewlett-Packard Co., have hinted that they may turn to litigation.

AT&T told licensees that it will deliver information regarding its new release of Unix in a timely fashion. Beginning in the middle of this year, AT&T will hold briefing seminars for systems vendors and software developers.

In 1989, AT&T plans to revise drafts of the next version of its System V Interface Definition (SVID) with the industry. Also next year, AT&T will offer the System V Verification Suite, software that enables vendors to test their systems for conformance with SVID. Beta-test versions are scheduled to be available this year.

"The idea that AT&T would abandon its policy of Unix openness is pure folly," said Jack Scanlon, vice-president of product development for AT&T's Data Systems Group. "The only way AT&T can succeed in this marketplace is by continuing its policy of openness."

Sun argued that Unix's growth will be impeded by fragmentation if other vendors fail to support Release 4. "If we can get this industry behind a single binary standard, Unix will present a major alternative as a development platform," said Edward Zander, Sun's corporate marketing vice-president.

Sun Microsystems *at Uniforum 1988*

Other Uniforum announcements included the following:

- HP said it will offer a CPU upgrade for its HP 9000 Model 825S and 825SRX workstations, based on the firm's Precision Architecture using reduced instruction set computing. The systems have been upgraded to a performance level of 2.02 million floating-point operations per second, a threefold improvement from earlier models. The upgrade is priced at $10,000. Model 825S is priced at $42,500, and Model 825SRX costs $69,500.
- Sun took time out from the Unix controversy to announce yet another alliance — this time with Amdahl. Under the agreement, Amdahl and Sun will jointly develop and market products linking Amdahl's mainframes and Sun's workstations.

Amdahl has licensed Sun's Network File System, which it plans to port to its UTS operating system based on Unix. Sun and Amdahl said they will make joint sales calls to selected customer accounts.

A/UX ships following lengthy delay

BY JULIE PITTA
CW STAFF

DALLAS — Apple Computer, Inc. used its first appearance at the Uniforum 1988 conference last week to announce that it is shipping A/UX, an "Apple-ized" version of Unix, some seven months late.

Apple's version of AT&T's Unix System V, Release 2.2, with the University of California at Berkeley's Unix 4.2 and 4.3 extensions, runs on the Macintosh II. It features the Macintosh Toolbox, which can be used to create the Macintosh user interface in A/UX applications.

An upgrade bundle for current Mac II owners consists of an internal or external 80M-byte hard disk drive with A/UX, the Motorola, Inc. Physical Memory Management Unit (PMMU) and 4M bytes of random-access memory. It is priced at $4,879 for the internal drive version and $4,979 for the external drive version.

Entry-level loaded

An entry-level configuration of a Macintosh II with A/UX costs $8,597. That system includes a Mac II with 2M bytes of RAM, a 12-in. monochrome monitor, a 4-bit video card and an 80M-byte hard disk drive loaded with A/UX and PMMU. Additionally, Apple said it will distribute a set of reference manuals for $649.

Apple offered no projections of how many A/UX systems it expects to ship but said it has 100,000 copies of A/UX ready for shipment. The operating system was originally planned for release in July 1987.

A number of third parties jumped on the A/UX bandwagon. A total of 50 third-party products for A/UX were introduced at Uniforum.

Among those offerings for more mainstream applications were a port of Relational Technology, Inc.'s Ingres relational data base management system to A/UX, allowing Mac II users with A/UX to integrate data in Ingres files stored on other microcomputers, minicomputers and mainframes.

Also, Informix Software, Inc. in Menlo Park, Calif., introduced Wingz for A/UX, an integrated spreadsheet it acquired when it merged with Pittsburgh-based Innovative Systems, Inc.

Set for availability in the second quarter and priced under $500, Wingz was designed to operate under both the Macintosh operating system and A/UX.

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PC-to-Unix standard offered

BY PATRICIA KEEFE
CW STAFF

DALLAS — If Hewlett-Packard Co. and Microsoft Corp. have their way, the standard for personal computer-to-Unix integration will be Microsoft's OS/2 LAN Manager running under AT&T's Unix System V.

The jointly developed proposed platform, as announced last week at Uniforum 1988, will be called Microsoft LAN Manager/X (LM/X). According to the plans, HP will provide the Unix port using LAN Manager source code, but Microsoft will retain OEM licensing rights.

LM/X would reportedly allow users to mix Microsoft MS-DOS, Xenix and OS/2 applications and systems on a network, accessing Unix System V-based servers without additional workstation software.

Also, LM/X would support advanced networking services such as shared data bases, directory services, mail services and distributed applications.

Based on the Server Message Block protocol standard, LM/X allows a Unix System V-based server running LM/X to handle requests from workstations running software based on Microsoft's MS-Net, MS-Net for Xenix and OS/2 LAN Manager.

In addition, Microsoft promised LM/X server support for IBM's PC LAN Program and OS/2 Extended Edition. LM/X would support the LAN Manager's controversial interprocess communications mechanisms — redirected, or named, pipes and mail slots.

IBM has said it will not support these facilities. HP said it will talk to its OEMs before deciding on support.

LM/X due in 1989

The initial release of LM/X, slated for early 1989, will reportedly run on Intel Corp. 80386-based systems under Microsoft's Unix System V/386 Release 3.2, a merger of Xenix and Unix System V scheduled for release in the third quarter. LM/X will require 2M bytes of random-access memory, a hard disk and a monochrome IBM Color Graphics Adapter, Enhanced Graphics Adapter or compatible monitor.

HP said it will first support LM/X on its HP 9000 computers running the HP-UX operating system. There are no plans to port LM/X to the HP 3000 series, an HP spokesman said.

LM/X would be capable of running on a variety of networking hardware, including IBM's Token-Ring network, the IEEE's 802.3 Ethernet and Starlan, and can coexist on the same server with AT&T's Remote File Sharing and Sun Microsystems, Inc.'s Network File System.

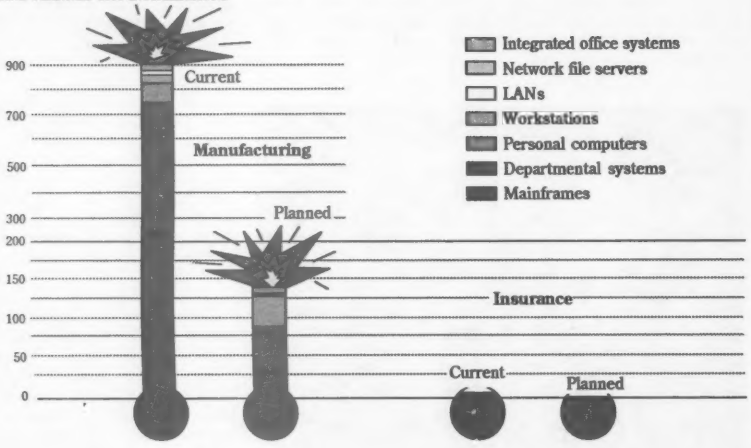
In addition, OEMs can port LM/X to transport protocols such as the Transmission Control Protocol/Internet Protocol and Open Systems Interconnect.

TRENDS

DEC hardware

Hot and cold in vertical markets

NUMBER OF SYSTEMS CURRENTLY INSTALLED AND PLANNED 1988 INSTALLATIONS



Despite the company's efforts to expand into new markets, more immediate growth opportunities for Digital Equipment Corp. may lie in its proven markets.

A recent study of DEC's opportunities in vertical markets shows manufacturers are planning to acquire the broadest range of DEC systems and that the vendor has made a minimal impact on the insurance industry. The study was conducted by Tempe, Ariz.-based market research firm The Sierra Group.

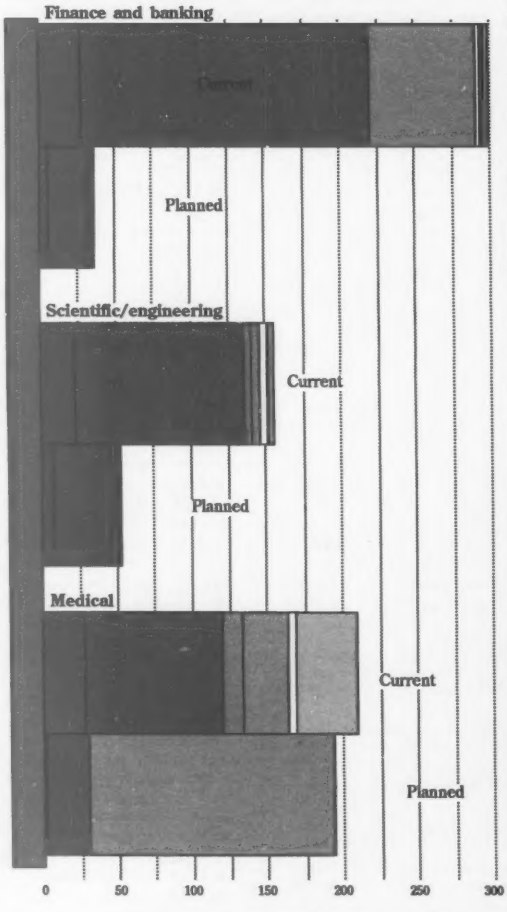
The group reported DEC's installed base numbers and 1988 DEC acquisition plans for 870 user companies, 367 of which counted fewer than 500 employees and 108 of which reported more than 10,000 workers.

The 240 firms in the medical category plan to install the most DEC systems in 1988. But 160 of the 191 systems that those firms plan are workstations; only two are large VAX systems or clusters of VAXs.

The 154 manufacturing companies that responded to the survey intend to install only 136 DEC systems. But 26 of those are large systems, and 55 are departmental systems.

Scientific and engineering users plan to acquire 52 systems, including 46 mainframes or departmental computers. DEC has targeted industries such as the insurance field in recent years, but 171 insurance firms reported an installed base of 10 DEC systems, with plans to acquire only two in 1988.

JAMES CONNOLLY



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INSIDE LINES

Certified treaty. After three months of negotiation, IBM and the Computer Dealers and Lessors Association are set to announce an agreement that will resolve their differences concerning IBM's policy on deinstallation and reinstallation of equipment that was announced last fall. The solution reportedly relaxes IBM's policy, which stipulated that equipment moved by anyone other than IBM would be subject to charges to be recertified under IBM's Maintenance Agreement, and should make it easier for users to deal with both leasing companies and IBM, sources say.

Pit Bull processors. One wave in the flood of announcements due this week is a move by Honeywell Bull to pit three multiprocessor versions of its DPS 7000 supermini against the IBM 4381 and DEC VAX 8700. The DPS 7000 was the first major introduction for young Honeywell Bull last April and is a focal point of the company's strategy.

From the Oracle. Oracle this week will lay out its plans for supporting the increasingly popular Apple Macintosh. High on the agenda is the announcement of a distribution agreement concerning an interface between Oracle's DBMS and Apple's Hypercard hypertext system. Oracle will also announce plans to connect the Mac to various hosts running Oracle and the possible announcement of an A/UX version of Oracle.

Racing for share of mind. There is some fascinating pre-ship jockeying between Microsoft — with the Sybase/Microsoft/Ashton-Tate SQL Server — and Lotus for a share of the future data base market. Both firms are seeking MIS mind share in the hopes of lucrative sales of server-based SQL DBMSs later this year and into next. Until now, however, Lotus has told the world little about its plans, and the firm has yet to formally acknowledge that its DBMS is based on an engine from Gupta Technologies. That should change this week when key Lotus execs begin to specify how Lotus/DBMS will work and who should use it.

Calling Dick Tracy . . . A tiny Pittsburgh software house dragged out words like "racketeering" last week when it took on Tandem Computers and Mack Trucks, Inc. in federal court. Performance Associates Corp., which says its work force has been slashed from 22 to four because of its foes' actions, accused Tandem and Mack of racketeering and misappropriating trade secrets. Performance Associates also said the latter company conspired with Tandem to take over a branch automation package that it was developing for Mack. Tandem and Mack spokesmen declined comment.

The Lowe highlights. IBM's Entry Systems Division President Bill Lowe gave analysts a hint of things to come at an IBM seminar last week. Slides of IBM's future included lots of empty boxes meant to represent unannounced PS/2 models. Lowe indicated that by the end of the year, the low end of IBM's PS/2 line will be Intel 80286-based machines; by 1989, it will be 80386-based machines. Lowe also implied that the PS/2s, including the Model 50 with its lowly 20M-byte drive, will be field-upgradable.

Window watching. Two corporate users said last week that they have seen early versions of the Presentation Manager Version 4.11 and were a bit underwhelmed by what they saw. They said the program still looks very much like Windows 2.0 and were disappointed that its icons didn't look very "Mac-like." IBM told them, however, all that will change with the next few versions. Version 4.13 of the program, slated to be released in the next couple of weeks, will be the basis for the developer's version, expected by the end of March.

The Toshiba sanction. The Pentagon is getting ready to comply with a 1987 congressional mandate to stop buying products from Toshiba due to the scandal involving Toshiba's sale of military gear to the Soviet Union. For the next six months, the proposed regulation says, the Defense Department cannot buy any Toshiba product or any system with more than 50% Toshiba components. However, this action is likely to be replaced by less severe sanctions in the forthcoming omnibus trade bill.

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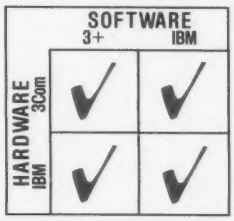

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